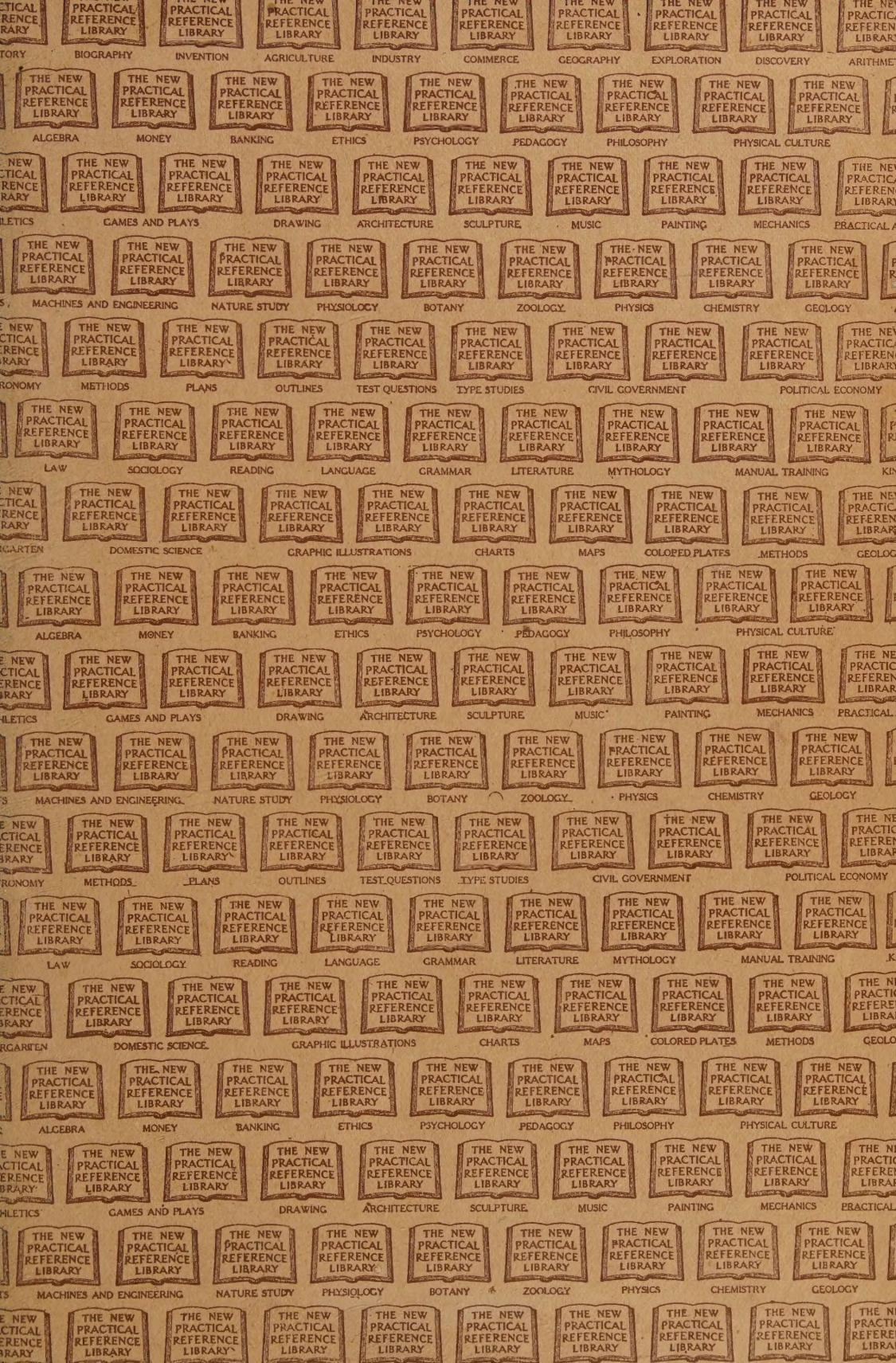
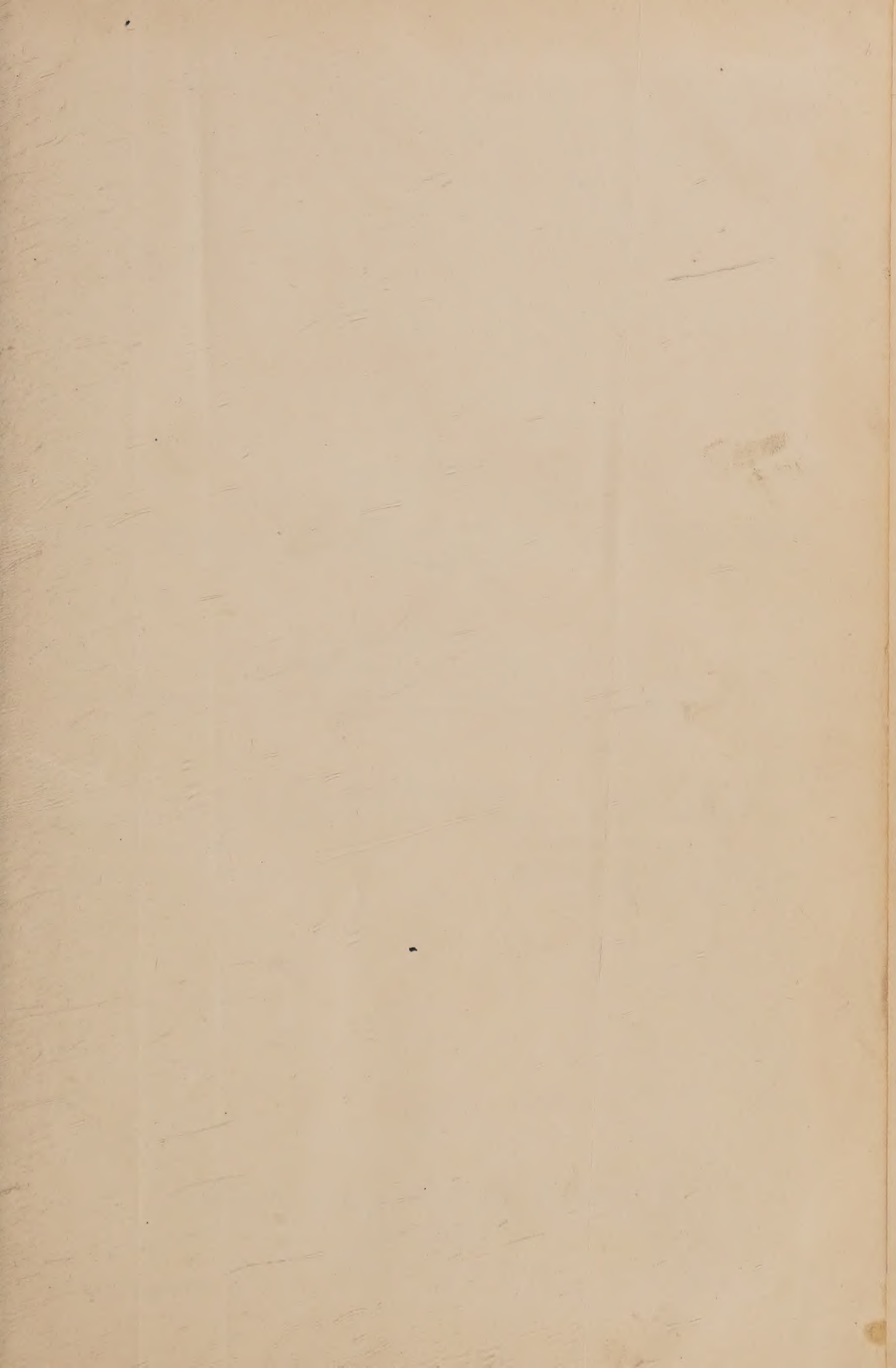








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Lake, a large body of water wholly surrounded by land, having no direct or immediate communication with the ocean or with any seas, or having such only by means of rivers. Lakes are divided into four classes (1) Those having no outlet and receiving no running water, usually very small. (2) Those having an outlet, but which have no running waters on the surface and are consequently fed by springs. (3) Those which receive and discharge their water by streams, by far the largest class. (4) Those which receive streams but have no visible outlet, being generally salt, such as Great Salt Lake, the Caspian Sea, the Dead Sea and the Aral Sea.

Lake Charles, LA., the parish-seat of Calcasieu parish, 216 mi. w. of New Orleans, on the Southern Pacific, the Kansas City Southern and other railroads. The city has a beautiful location on the Calcasieu River and on the shore of Lake Charles, between the great rice fields and the forests of long-leaved pine, and has extensive rice, cotton and lumber mills and other industries. It is the seat of Acadia College. The place was settled in 1849 and was incorporated in 1860. Population in 1910, 11,449.

Lake City, FLA., the county-seat of Columbia co., 60 mi. w. of Jacksonville, on the Atlantic Coast Line, the Sea Board Air Line and other railroads. It is the seat of the state agricultural college and of a United States agricultural experiment station. The town is surrounded by a cotton-growing region and has a considerable trade in cotton, lumber, turpentine, phosphates and fruits. Population in 1900, 4013. The municipal limits were extended in 1901, and the population was estimated in 1902 at 6000; in 1910 it was 5032.

Lake Dwellings, a name commonly applied to the prehistoric dwellings of which numerous remains have been found in the lakes of Switzerland and other parts of southern Europe. These remains were not known until 1853 and 1854, when the discoveries were first made in a lake near Zurich. Since then other similar discoveries have been made which show that some of these villages built on piles in the water were constructed during the Stone Age, that others were built after iron was in use and that a period of three or four thousand years must have elapsed between the building of the first and the last of those now known. In some places the huts were built on islands which the prehistoric man had built, and in other cases piles made of sharpened tree trunks were

driven into the bottom of the lake, platforms built upon the tops of the piles and the houses constructed upon the platforms. Remains of various grains and some fruits have been found, and it has been proven that these people had herds of cattle and goats and knew something of the manufacture of pottery.

At the present time there are people in South America, as seen in Lake Maracaibo, who dwell in separate houses on tall piles.

Lake of the Woods, a lake on the southern boundary of Ontario and on the northern border of Minnesota, 190 mi. w. n. w. of Lake Superior. It is 65 miles in length and has an extremely irregular form and a coast line of about 300 miles. It is studded with numerous wooded islands. Rainy River, the principal feeder of the lake, enters it at its southeastern extremity; its discharge is at the north by the Winnipeg River.

Lakes, GREAT. See GREAT LAKES.

Lake School or **Lake Poets**, a name given by the *Edinburgh Review* to Wordsworth, Coleridge and Southey, because they lived in the Westmoreland and Cumberland lake district. They had little in common except their non-classicism.

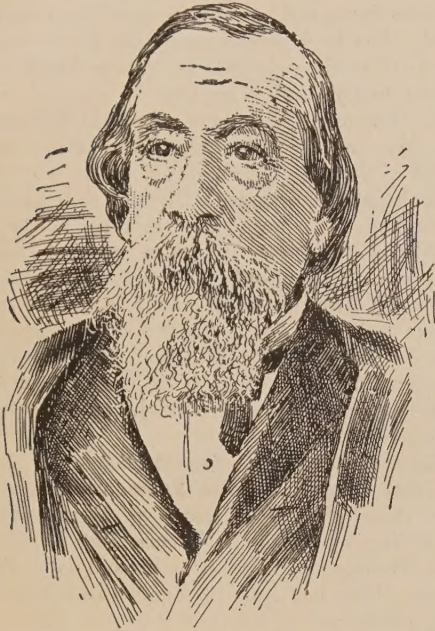
Lak'hnau. See LUCKNOW.

Lamaism, *lah'mah iz'm*, a variety of Buddhism dating from the seventh century after Christ and prevailing chiefly in Tibet and Mongolia. It is named from the *lamas*, or priests, belonging to it. The highest object of worship is Buddha, who is regarded as the founder of the religion and the first in rank among the saints. In the priesthood there are two heads, the *Dalai-lama* and the *Tesho-lama*, in whom Buddha is supposed to be incarnate. The *Dalai-lama* and *Tesho-lama* are equal in rank and authority in name only, for the former, possessing a much larger territory, is in reality much the more powerful. His residence is at Potala, near Lassa, and he is the acknowledged head of the Buddhists, not only in Tibet, but throughout Mongolia and China. See BUDDHISM.

Lamar, *la mahr'*, LUCIUS QUINTUS CINCINATUS (1825-1893), an American lawyer, politician and jurist, born in Putnam County, Georgia, educated at Emory College and admitted to the bar in 1847. He moved to Mississippi and was elected representative in 1856. In 1861 he resigned and joined the Confederate army as lieutenant colonel, but later spent two years in Europe as unofficial

Lamarck

representative of the Confederacy. He was professor of law in the University of Mississippi,



LUCIUS Q. C. LAMAR

1867-1872, when he was again sent to Congress, becoming senator in 1876. He was reelected in 1882, but in 1885 became secretary of the interior in President Cleveland's cabinet. He was later appointed associate justice of the Supreme Court of the United States. During his political career his single purpose was to effect complete reconciliation between North and South, and he did much to accomplish this end. He was a brilliant orator.

Lamarck, *la mahrk'*, JEAN BAPTISTE PIERRE ANTOINE DE MONET (1744-1829), a French naturalist. He was educated for the Church, but entered the army and served in the Seven Years' War. Disabled by an accident, he repaired to Paris and devoted himself to the study of medicine and physical science. He gave the name Jardin des Plantes to the royal botanical garden. His chief works are *Philosophie Zoologique*, a work in which he introduced great reform in the classification of animals and set forth a theory foreshadowing what is now known as the law of evolution; *Histoire Naturelle des Animaux Vertébrés*, and *Tableau Encyclopédique de la Botanique*.

Lamartine, *lah mahr teen'*, ALPHONSE DE (1790-1869), a French poet and statesman.

Lamb

By his first production, *Poetic Musings*, he at once obtained a high place among the poets of the day. In 1820 he was attached to the legation at Naples, and married a rich English lady, Miss Birch. The *New Poetic Musings* and the *Poetic and Religious Harmonies* established his poetic fame and obtained for him admission into the French Academy. After the Revolution of 1830 he traveled in the East, and on his return he published *A Voyage in the East*. During his absence he had been elected a member of the Chamber of Deputies, and thenceforward his career was as much political as literary. In 1847 he published his *History of the Girondins*, in which he manifested strong republican leanings. After the February revolution of 1848 he became a member of the provisional government, in the capacity of minister of foreign affairs. For some months he enjoyed unbounded popularity, and his energetic behavior was on more than one occasion the means of averting incalculable evils. After the insurrection of June, 1848, he lost his popularity, and in 1851 he withdrew from public life. He was latterly much impoverished and was finally voted an annuity.

Lamb, *lam*, CHARLES (1775-1834), an English poet, essayist and humorist. He was educated



CHARLES LAMB

at Christ's Hospital, where he formed his lifelong friendship with Coleridge. After leaving

Lambayeque

school, the greater part of his life was devoted to the safe-keeping and care of his sister Mary, who in a fit of acute mania had stabbed her mother fatally. Charles refused to allow her to be confined permanently in an asylum, and except during attacks of her mania, she was in his home. His first appearance as an author was in 1798, when he published a number of poems, in conjunction with his friends, Coleridge and Lloyd. These attracted little attention, nor was he more successful with his two attempts at the drama, *John Woodville*, written in imitation of the early English dramatists, and a farce entitled *Mr. H.* His *Tale of Rosamund Gray*, although it was well received, did not bring him fame; but with the publication of his *Tales from Shakespeare*, written in conjunction with his sister Mary, he came at once into popular favor. *The Adventures of Ulysses* followed, and in *Specimens of English Dramatic Poets Contemporary with Shakespeare*, he brought to public notice the almost unknown lesser dramatists of the sixteenth century. He owes his chief literary distinction, however, to his delightful *Essays of Elia*, contributed chiefly to the *London Magazine*. Here, in a style ever happy and original, he has carried the short humorous essay to a point of excellence perhaps never before attained.

Lambayeque, *lahm'ba yay'kah*, a town in Peru, capital of the department of the same name, situated on the river Lambayeque, six miles from the sea. Its industries consist chiefly in the manufacture of cotton and woolen goods. Population, estimated at 8000.

Lam'bert's Pine, a pine growing in California, sometimes reaching the height of 300 feet. It yields, when burned, a sugary substance, known as California manna. The leaves are in fives; the cones are fourteen to eighteen inches long and contain edible seeds.

Lam'bertville, N. J., a city of Hunterdon co., on the Delaware River and on the Pennsylvania railroad. Its industries include the manufacture of flour, paper and wooden and rubber articles. It is connected by a bridge with Newhope. Population in 1910, 4657.

Lam'enta'tions, the name of a book in the Old Testament in the Authorized Version of the Scriptures, occupying a place between the books of *Jcremiah* and *Ezekiel*. *Lamentations* is a poem in five chapters, which, with the exception of the fifth, are arranged in verses corresponding to the letters in the Hebrew alphabet. In chapters one, two and four the

Lamp

verses are arranged alphabetically. In chapter three the first three verses begin with the first letter of the alphabet, the second three with the second, and so on. This chapter has sixty-six verses, while the first, second and fourth have twenty-two verses each, the number of verses corresponding in this case to the number of letters in the alphabet. The fifth chapter is not alphabetically arranged and is supposed by some critics to have been written by another author, though the entire book is generally ascribed to the prophet Jeremiah. *Lamentations* treats of the destruction of Jerusalem and the suffering of its defenders, while it laments the catastrophe, especially because it was brought on by the sins of the people.

Lammergeier, *lam'mur gi'ur*, sometimes called the *bearded vulture*, a bird of prey which occupies an intermediate position between the eagles and the vultures. It is found in the Swiss and German Alps, as well as in the higher mountains of Asia and Africa, and is the largest European bird of prey. It is about four feet in length and has a wing expansion of from nine to ten feet. It preys on small quadrupeds, on chamois, lambs and hares, but does not refuse dead and decaying meat.

Lamont', DANIEL SCOTT (1851-1905), an American lawyer and politician, born in Courtlandville, N. Y., and educated at Union College. He did not graduate, but entered journalism at Albany, and in 1883 he became private secretary to Governor Grover Cleveland. He continued in this position after Cleveland became president, and upon his second election Lamont was made secretary of war. At the close of his term in 1897, Lamont was elected vice-president of the Northern Pacific Railway.

Lamp, a device for producing an artificial light. Originally the lamp consisted of a vessel for holding an inflammable fluid in which a wick was suspended, but now the term is applied to any arrangement for illuminating purposes, whether it uses gas, electricity or an illuminating fluid. The first lamps had shells or the skulls of animals for cups, and reeds or rushes for wicks. The fluid usually consisted of the fats of animals, but later oils from plants came into use and were more acceptable, because they remained liquid at a lower temperature. Cloth or a roll of tow was finally substituted for rushes as wicks. Lamps of this sort gave a dim light, made a great deal of smoke and were not very satisfactory.

In the latter part of the eighteenth century a

Lampblack

Frenchman named Argand invented a burner which used a flat wick in a round tube, so arranged that the air could pass through the tube and reach the center of the flame. This improvement is the greatest ever made in the lamp. With the introduction of kerosene came further changes. The wick was made broad and flat, and the flame was enclosed in a glass chimney, resting upon a perforated bottom. This arrangement caused a good circulation of air about the flame.

The ancients regarded the lamp as a symbol of wisdom and as a sacred emblem. The candlestick which stood in the Tabernacle of the Jews, and later in the Temple, was a stand for holding lamps, and the lamp is still found in Catholic churches and those of some other denominations. The Roman lamp also frequently adorns the title pages of books and diplomas given by educational institutions.

Lamp'black, a fine soot, formed by the condensation of the smoke of burning oil, pitch or resinous substances, as in a chimney. It is used in the manufacture of pigments, blacking and printing inks. See CARBON.

Lam'prey, the popular name of several species of eel-like, scaleless fishes, which inhabit



LAMPREY

both fresh and salt water. The lampreys have seven apertures on each side of the neck and an aperture on the top of the head. The mouth is in the form of a sucker, lined with strong teeth and cutting plates. The *marine*, or *sea*, lamprey sometimes reaches a length of three feet and a weight of five pounds. It is of a dusky brown, with yellowish patches, is common round the British coasts and is also found in the Mediterranean. It ascends rivers in the spring for the purpose of spawning and was formerly much valued as an article of food. The *river lamprey*, or *lampern*, is a smaller species and abounds in the fresh-water lakes and rivers of northern

Lancaster

countries. It is often seen clinging to stones with its mouth. It is black on its upper parts and of a silvery hue on its under surface. Lampreys attach themselves to other fishes, such as the shark, sturgeon or salmon, and suck their blood; they also eat soft animal matter of any kind. See HAGFISH.

Lan'caster, ENGLAND, the county-town of Lancashire, 45 mi. n. e. of Liverpool. There is in the town an ancient castle, now used as the county jail, built in the reign of Edward III, but with a keep supposed to be Saxon and with a tower on the southeast attributed to the emperor Hadrian. The industries comprise the manufacture of furniture, sailcloth, cotton goods, floor cloth, oil and varnish. Population in 1911, 41,400.

Lancaster, OHIO, the county-seat of Fairfield co., 30 mi. s. e. of Columbus, on the Hocking River and the Hocking Canal and on the Cincinnati & Muskingum Valley and the Hocking Valley railroads. The city is in the natural gas belt and is surrounded by a rich agricultural region. The shipping facilities are good, and the city is the seat of railroad shops and manufacturing of agricultural implements, foundry products, carbons, flour, shoes and glass. The state industrial school for boys is located here. The place was settled in 1800. Population in 1910, 13,093.

Lancaster, PA., the county-seat of Lancaster co., 68 mi. w. of Philadelphia, on the Conestoga River and on the Philadelphia & Reading and the Pennsylvania railroads. The city is the seat of large tobacco factories and extensive manufacturing of cotton, iron and steel goods, shoes and other articles. Franklin and Marshall College is located here and one of the state normal schools is at Millersville, near the city. The public institutions include the Lancaster General and Saint Joseph's hospitals, the Children's and Stevens's homes and several libraries. Other features of interest are the Soldiers' Monument and Witmer's stone bridge. The place was settled about 1718 and was called Hickory Town until 1729. From 1799 to 1812 it was the capital of the state. It was chartered as a city in 1818. Population in 1910, 47,227.

Lancaster, HOUSE OF, the name used in English history to designate the line of kings immediately descended from John of Gaunt, fourth son of Edward III. Henry IV, who received the crown on the enforced abdication of Richard II (1399), was the first king of this House and established a strong government,

Lancaster

which was continued under his successor, Henry V. Henry VI was a weak king, and during his rule arose the Wars of the Roses. See HENRY IV; HENRY V; HENRY VI; ROSES, WARS OF THE; YORK, HOUSE OF.

Lancaster Sound, a passage leading from Baffin's Bay to Barrow's Strait. It was discovered by Baffin in 1616. It is about 250 miles long and 65 miles wide.

Lance, *lans*, a weapon consisting of a long shaft with a sharp point. It was common among the Greeks and Romans. The Macedonian phalanx was armed with it, and it was the chief weapon of the Roman infantry. The lance was the chief weapon in the Middle Ages and was especially the arm of knighthood. The introduction of firearms gradually led to the disuse of the lance in the west of Europe, though it continued in the east. Napoleon organized several regiments of Polish lancers for service in his army, and now most of the armies of Europe have regiments of Uhlans, or lancers.

Lancelot, *lan'se lot*, of the **Lake**, the name of one of the knights celebrated in the traditions and fables relating to King Arthur and the Round Table. According to tradition, Lancelot was of royal birth, was educated by the Lady of the Lake and was taken by her to Arthur's court, where he became one of the chief knights. His love for Guinevere, the beautiful wife of Arthur, and his disregard of Morgana, a fairy and the sister of Arthur, placed the knight in the most dangerous and marvelous situations, from which, however, he always extricated himself by his valor and the help of the Lady of the Lake. Elaine, the maid of Astolat, loved Lancelot and died of her love. Lancelot is one of the chief figures in Tennyson's *Idylls of the King*, and the love between him and Guinevere is the main thread of the series.

Lancet, *lan'set*, **Fish**, one of the largest and most formidable of deep-sea fishes, found both in the Atlantic and the Pacific. The bodies are long and scaleless, and the snout is prolonged, the mouth being supplied with long fangs and small teeth. They vary in length from two to four feet and have sharp spines, one on each side of the tail. The Pacific species is known as the handsaw fish, from the saw-like ventral fin. Still another species is called the wolf fish. The name lancet fish is popularly applied to certain other fish common about coral reefs.

Lancewood, *lans'wood*, the popular name of the wood of several tropical trees of the same order, which possesses in a high degree the

Landgrave

qualities of toughness and elasticity and is on this account extremely well adapted for the shafts of light carriages, fishing rods and all those uses where light, strong, but elastic timber is required.

Land and Sea Breezes, the name of daily winds, which blow alternately on and off shore. During the day the land becomes heated to a higher temperature than the sea, and a little before noon a breeze begins to blow landward. This increases in strength until about the middle of the afternoon, when it gradually subsides. During the night the land radiates heat rapidly and becomes cooler than the sea, so that after midnight in most localities a breeze sets in, blowing off shore and continuing until about sunrise. Land and sea breezes are regular occurrences in the tropical regions that are free from local storms, and they are gentle winds. In the temperate latitudes they are not as regular, since they are liable to be disturbed by local conditions. Similar breezes occur along the shores of the Great Lakes and other large bodies of fresh water, though they are not as distinctly marked as the true land and sea breezes.

Land Crab, a species of crab which takes its name from the fact that when full-grown it lives upon the land. The family is large and includes a number of genera, all of which live in warm countries. The land crab resembles common crabs very closely. All species breathe by gills, and some of them inhabit dry places and burrow in the sand or the earth. They are supposed to carry their eggs to the water and for this reason make periodical migrations to the sea or other near bodies of water. Among the most common species are the *black crab*, or *mountain crab*, of the West Indies. It lives in the woods and hills and is often found two or three miles from shore, but regularly visits the sea in the months of April and May. Nearly all species are active during the night, and except in rainy weather they remain concealed during the day. Some of the species are esteemed for food, and the eggs are also considered a delicacy. Land crabs generally feed upon plants, and in some localities they are destructive to sugar cane and other agricultural plants. See CRAB.

Landgrave (German, *Landgraf*), in Germany, about the twelfth century, the title assumed by certain counts, to distinguish them from the inferior counts under their jurisdiction. There were at first three landgraves, the princes of the territories of Thuringia, Lower Alsace and Higher Alsace.

Land League, an organization projected in 1879, by Charles Parnell, the leader of the Irish national movement, the ostensible object of which was to purchase the land of Ireland for the people of Ireland. Funds were largely subscribed, especially in America, but the league's lawless decrees against landlords and tenants who held aloof from it, and the alleged complicity of its members with many terrible outrages, caused it to be suppressed in 1881. After the suppression of the Land League a political and agrarian organization, called the *National League*, was formed. Its main objects are the reform of the land laws, the weakening of the power of the landlords, the increase of peasant proprietors and a semi-independent government for Ireland.

Landlord and Tenant. See LEASE; TENANT.

Lan'dor, WALTER SAVAGE (1775-1864), an English poet and prose writer. He was educated at Rugby and Oxford, from both of which he was expelled for unruliness. In 1795 he issued a small volume of poems, and in 1798 he published a lengthy poem, *Gebir*, which he afterwards translated into Latin. His fame chiefly rests on his *Imaginary Conversations* between celebrated persons of ancient and modern times, which is a model of a pure, vigorous, finished English style.

Lands, PUBLIC, a part of the national domain which is owned exclusively by the government and is subject to its sale or disposal. It consists wholly of land secured from other nations by treaty, from the states by cession and from indian tribes by treaty, cession and conquest. At the organization of the national government there were no public lands, except those under the jurisdiction of the several states or claimed by them. This, however, included a large territory northwest of the Ohio River, known as the Northwest Territory. Before the adoption of the Articles of Confederation the several states ceded to the national government all their claims to this territory, and at that time the first public domain was created. Soon afterward North Carolina, Georgia, South Carolina and Virginia ceded their claims to other lands south of the Ohio River and west of the Alleghanies. In 1803 the United States gained by the Louisiana Purchase (including Oregon) more than 1,000,000 square miles. In 1819, by the acquisition of Florida, it secured some 60,000 square miles. By the annexation of Texas in 1845, the public domain received an addition of

262,000 square miles. At the close of the Mexican War in 1848 the present territory of New Mexico and California was added, with a total area of 523,800 square miles. In 1853, by the Gadsden Purchase, 36,200 square miles was added, and in 1867, with the purchase of Alaska, another increase of 577,000 square miles was secured. The part of this vast territory which has been reserved by the general government at the time of the organization of states and territories is known popularly as the *public lands*.

Six methods of disposing of these lands have been followed, of which the most important in the early years of the government was that of gift and special grant. These were of several kinds: those made to individuals by reason of special service; those made to the states for the purpose of encouraging education or building public roads or railroads; those made to the railroads and other corporations as an inducement to develop the resources of the country. The government also disposed of its lands by sale, at first in large quantities for a nominal sum, and later in smaller quantities for reasonable compensation. It has also sold them at public auction, the minimum price accepted being \$1.25 per acre. It has granted them by preëmption. According to this scheme persons who desire to secure lands for farming or some other direct use, may settle upon the land, live there for six months and at the end of that time, by paying \$1.25 per acre, receive the clear title to the property. This law has been repealed. The Homestead Laws provide a somewhat different course of procedure. They require a residence of five years upon the land, when the title will pass to the occupant upon the payment of a nominal fee, rarely more than \$30. The maximum amount granted to any one settler or head of a family is 160 acres. By the so-called Timber Culture Act of 1878, which has recently been repealed, any person who proved that he had planted a certain number of acres of land with timber would receive a patent for not more than 160 acres.

The management of the public lands rests with a bureau of the department of the interior, known as the General Land Office, presided over by a commissioner appointed by the president. He has charge of the survey and disposal of the land and carries on the work through "land offices" scattered throughout the states. The survey of the public lands is made according to the so-called rectangular system, which was first adopted



A DISTINGUISHED MEMBER OF THE HUMANE SOCIETY—*Landseer*
London, England

Landscape Gardening

in surveying the lands in the Northwest Territory, about 1790. It provides for the division of lands into ranges, townships, sections and quarter-sections. The ranges extend in a north and south direction and are numbered east and west from a principal meridian. These ranges are 6 miles wide and are divided into townships 6 miles square, which are numbered north and south from a certain parallel. The townships are subdivided into sections, each one mile square and numbered according to a uniform system. Each section is divided into quarter-sections, which are designated by their direction from the center, as northwest, southwest, northeast and southeast. It is therefore possible to designate any plot of land as small as 40 acres (and even less) with perfect accuracy.

According to the latest report of the commissioner of the General Land Office, there are still unappropriated and unreserved public lands in the United States, to the amount of 665,891,029 acres. Of these, more than 367,000,000 are in Alaska. Of the other states and territories, Nevada contains the greatest area of unappropriated public land, with 55,138,593 acres. Arizona contains 39,525,195; New Mexico, 31,298,621; Utah, 33,837,596; Wyoming, 32,255,679; Montana, California and Colorado follow in the order named, each with somewhere near 20,000,000 acres. Most of this land is in regions where irrigation is necessary, or regions unsurveyed and therefore not open to entry. Since 1900 much greater care has been exercised in disposing of public lands than in previous years. See HOMESTEAD LAWS.

Land'scape Gardening, the art of laying out grounds, arranging trees, shrubbery and flowers, so as to bring into harmonious combination all the varied characteristics of a park or lawn. It disposes flowering plants, shrubs and trees over varying levels, in such a manner as to produce the most pleasing effects; it shuts out undesirable views by means of judicious planting, and it introduces rock work, water and other artistic embellishments, where the local peculiarities of the ground permit. Landscape gardening has become a distinct art, and landscape gardeners of great skill are employed to lay out city parks and other public grounds. See HORTICULTURE.

Land'seer, EDWIN, Sir (1802-1873), a famous English painter, born in London. He began to draw animals when a mere child, and at the age of twelve he was able to paint with great skill. In 1825 he went to Scotland to visit Sir

Langland

Walter Scott, whom he painted with his dogs. After this he rapidly rose to fame, producing pictures of animals painted with so much sentiment and feeling that they seemed almost human. In 1831 Landseer became a member of the Royal Academy and later was knighted. Among his best known works are *Dignity and Impudence*, *Alexander and Diogenes*, *A Distinguished Member of the Humane Society*, *Connoisseurs*, *The Return from Deer Stalking*, *High Life and Low Life*, *Highland Drover Departing from the South*, *The Return from Hawking*, *The Shepherd's Chief Mourner*, *There's Life in the Old Dog Yet*, *The Stag at Bay* and *Dialogue at Waterloo*. The fine engravings made by his brother Thomas have made Landseer's paintings well known to the public.

Land's End, a headland in Cornwall, the westernmost point of England. There is a lighthouse on the dangerous rocks, the Longships, about a mile to the west.

Landsturm, *lahnt'stoorm*. See ARMY, subhead German Army.

Land Survey, *sur'vay*. See LANDS, PUBLIC.

Landwehr, *lahnt'vair*. See ARMY, subhead German Army.

Lan'franc (about 1005-1089), the first archbishop of Canterbury after the Norman Conquest, born at Pavia. He founded a law school in France and in 1046 was chosen prior of the Benedictine monastery of Bec. William of Normandy made Lanfranc prior of Saint Stephen at Caen, as a reward for procuring the pope's consent to William's marriage to his cousin, and in 1070 he made him archbishop of Canterbury. Among Lanfranc's writings are *Commentaries on the Epistles of Saint Paul*, *A Treatise against Berenger* and *Sermons*.

Lang, ANDREW (1844-1912), an English miscellaneous writer. He was educated at Edinburgh Academy, Saint Andrew's University and Balliol College, Oxford, where he took a distinguished position. A most versatile writer, he has published several volumes of ballads and other light verse; *Custom and Myth*, a valuable contribution to the science of comparative mythology; translations of Homer (with collaborators), of Theocritus and of Bion; *Letters to Dead Authors* and *Letters on Literature*, and several volumes of selected fairy tales.

Lang'land, WILLIAM (about 1332-1400?), the supposed author of the English poem, *The Vision of Piers Plowman*. The poem is allegorical in form and satirical in spirit; the trials and troubles of life generally, but more

particularly the corruptions of the Church and the worldliness of the ecclesiastical order, are its theme.

Lang'ley, SAMUEL PIERPONT (1834-1906), an American scientist and astronomer, born at Roxbury, Mass. He was educated in the Boston Latin School and also studied in Europe. He was successively assistant in Harvard observatory, professor of mathematics in the Naval Academy at Annapolis and director of the Allegheny Observatory. He became secretary of the Smithsonian Institution in 1887. Professor Langley made special observations which have added substantially to our knowledge of the sun's heat. He also extended the invisible portion of the solar spectrum and invented the bolometer, a very delicate instrument for measuring radiant heat. For several years he gave his attention to aerial navigation and was granted an appropriation of \$5,000 by Congress for experiments. See FLYING MACHINE.

Lang'try, MRS. LILLIE (1852-), an English actress, born at Le Breton, on the island of Jersey, the daughter of a clergyman. After her marriage to Edward Langtry in 1874, she became conspicuous in English society, being known as the "Jersey Lily," on account of her beauty. In 1881 she made her début in London in *She Stoops to Conquer*, and in the following year she appeared in America with great success. After the death of her husband she again married, and in 1903 she returned to America, where she appeared in *The Cross-ways*, a play written by herself in collaboration with J. Hartley Manners.

Language, lan'gwajj. See PHILOLOGY.

Language, METHODS OF TEACHING. The practical end and aim of all language teaching is the securing of the accurate and fluent use of pure English. While, as far as securing accuracy of expression is concerned, lessons on all subjects should be considered language lessons, yet, for the purpose of securing the practical end for which language is used, this subject must receive special attention.

PRIMARY GRADES. While in these grades language and reading are inseparably connected, yet each needs specific treatment, and after the first few months the best results are obtained by having language lessons which are distinct from the reading lessons. Language lessons should be devoted to two lines of work, oral and written.

1. *Oral Language.* The object of this line of work is to secure accurate and fluent oral

expression. In order that this may be done, proper habits of speech must be formed, and bad habits must be broken up. The first task is much easier than the second. Since pupils in the primary grades will not express themselves freely under embarrassment, every effort should be made to make them at home in the school-room and to give them the greatest freedom possible in their language work. Again, in order that the best results may be obtained, the subjects used should be those with which the pupils are perfectly familiar. Having planned the recitation along these lines, the teacher should so conduct it as to secure the following results:

(a) Freedom of expression. Lead the pupils to talk freely about what they say and do at home and in school and upon the playground. This will remove any embarrassment that they may feel because of their new surroundings and enable them to become acquainted with one another and with the teacher.

(b) Hold conversation lessons with the pupils and in this way become acquainted with their vocabulary. Notice also their wrong habits of speech. This will give a key to the habits that must be broken up.

(c) Classify the errors in common use by the pupils. It will be found that these errors usually reduce to errors in the use of the verb, the pronoun and the preposition. When these errors are known, the teacher has a guide which she can follow in breaking up the bad habits of speech which the pupils have formed.

(d) Lead the pupils to correct their errors in speech. This is a somewhat delicate task and one which will need to be approached carefully. If corrections are made in such a manner as to cause the pupil to feel embarrassed, he ceases to express himself freely, and one of the important objects of the language lesson is lost. Usually corrections are best made by incidentally giving the correct form and asking the pupil to repeat it, then in succeeding lessons calling his attention to it again and again, until its use becomes a habit.

2. *Written Language.* Written work in the first year consists in copying words and sentences from the reading lesson, and during the first half of this year but little stress is placed upon this phase of the work. However, the teacher should see that whatever is attempted is performed accurately. Pupils should be trained from the first to use correct forms. Capitals and the period should be used in the

first sentence that the child writes. He should be led to consider these a part of the sentence. Since these forms are learned from imitation, the teacher should place before the children only such forms as they can copy correctly. During the last months of the first year, very brief written exercises may be required of the more advanced pupils of the primary grade. These should be based upon the nature study work and stories which the teacher has read or told to the pupils. The subject upon which the pupils are to write should be thoroughly reviewed a short time before the lesson is given.

All through the work in primary grades memory gems should be taught, beginning with those which the youngest children can easily understand and enjoy, and increasing in length and difficulty as the pupils' ability to understand them develops. Great assistance is rendered the pupils also by reading suitable selections and interesting stories, provided the teacher is a fluent reader, uses a pleasant tone of voice and clear enunciation. Since pupils are imitators, the teacher should be exceedingly careful in her use of language, as they will copy any inaccuracies which she may place before them. In the second and third grades much more written work can be done, but too much should not be attempted. The tendency often is to require so much that the pupils do not have time to do the work well, and the teacher is unable to examine it properly. This leads to the habit of carelessness, which, when once formed, is very difficult to eradicate.

INTERMEDIATE AND GRAMMAR GRADES. The purposes of the language work in these grades are to enable the pupils to express themselves with ease and accuracy, either in speaking or writing; to make them acquainted with the fundamental principles and rules of English grammar and their application. The same fundamental principles given for work in the primary grades should be followed in these grades, but the work should be more extended.

1. *Written Work.* This should be along two lines, drill work and original composition. Drill work should be given for the purpose of securing accuracy in form and original composition. Exercises in spelling, copying portions of the reading lesson, stanzas of poetry and exercises in using the different forms of irregular verbs are good illustrations of what exercises, for drill purposes should be. If time is short and a course of study in which the work is definitely laid out is not at hand, it is well for

the teacher to classify these drill exercises, such as drills on the use of capitals, drills on the use of the comma, drills on the use of the forms of verbs. In this way definite work will be done, and all of the points upon which drill is necessary will receive attention. The value of this work is in its accuracy. Unless accuracy is insisted upon, these exercises contribute to the habit of carelessness and often do more harm than good.

Original composition should be carried on, along with the drill work. An important line of this work is letter writing. Pupils should begin this exercise in the third grade by writing simple notes, and they should continue it until they are able to write good letters, either of business or friendship. Many devices can be used to retain the interest, such as having pupils correspond with one another or having those in one school write to those in another. The letters may be read before the school. The ingenious teacher will discover many ways in which the work can be made interesting.

Another important line of work in these grades is the reproduction of stories told or read. At first the reproductions should be very simple, consisting of the reproduction of the thought in a stanza of poetry or a short paragraph of prose. The work should be increased in length and difficulty as the pupils advance in ability, until in the higher grades it should include the reproduction of some of the selections from the best authors. A similar line of work, but on different topics, is that of descriptions of places or people. Abundance of material is obtained from history, geography and literature for written exercises of every sort. In all cases abstract themes should be avoided, for children are not able to discuss them. The study of occupations and industries, including railroads and means of transportation, also furnishes many themes suitable for written language at these grades.

2. *Oral Language.* The purpose of oral language in these grades is to secure fluency of expression, correctness in speech and continuity of thought. The only difference between the work here and in the primary grades is in extending it to greater length and to more difficult topics. Oral reproductions of selections read, reciting such subjects as history and geography by topic, and the arrangement of reviews so that the different pupils in the class will recite fully upon different topics, afford excellent means for giving pupils drill in fluency of expression and continuity of thought. Such

exercises are particularly valuable, since they train the pupil to become a good conversationalist and to maintain his position with others after he leaves school. Oral reviews of books, articles in magazines and occasional debates among the older classes also tend to assist in securing the same end.

The terms and principles of grammar should be introduced incidentally, beginning with the fourth grade. Early in this year subject and predicate are easily taught. After the terms have been introduced the teacher should call attention to them frequently, until the pupils are able to recognize the subject and predicate in all short sentences. In a similar way, the names of the parts of speech should be taught, beginning with the noun and following with verb, pronoun, adjective and adverb. When these are learned and understood, the parts of speech expressing relation, such as the preposition and the conjunction, can be learned, though probably these will not be reached before the fifth grade. In the higher grades in the grammar schools and with the oldest pupils in the ungraded schools, the principles and rules of grammar should be emphasized. This does not mean that a text-book in grammar should be formally studied, but that these fundamental principles, such as the agreement of a subject with its predicate in number and person, the different forms of the common irregular verbs in the present, past and perfect tenses, and the agreement of pronouns with their antecedents, should receive enough attention to enable the pupils to become familiar with the application of these principles and to use them correctly. Teachers in primary language will find valuable assistance in Mrs. Cooley's *Language Lessons from Literature*, Book I; Metcalf and Bright's *Language Exercises*, and Mrs. Rankin's *Everyday English*, Book I; while Southworth and Goddard's *Elements of Composition and Grammar* is valuable for teachers of intermediate and grammar grades.

Lanier, la neer', SIDNEY (1842-1881), an American poet and musician, born at Macon, Ga. After graduating from Oglethorpe College, he taught one year and then entered the Confederate army. He served through the war, suffering so much from exposure and imprisonment that he was an invalid the rest of his life. After the war he supported himself for a time by teaching, serving as clerk in a shop and practicing law with his father in Macon;

but he devoted all of his spare time to music and literature. After 1873 he decided to give up all of his time to these arts, and in Baltimore and New York his musical ability was generally recognized. That his poetic ability was also admitted is shown by the fact that in 1876 he was chosen to write a cantata for the Centennial Exposition. In 1879 he was made lecturer on English literature at Johns Hopkins University, where he delivered the lectures afterward published as *The Science of English Verse* and *The English Novel*. He made frequent trips south in search of health, and on one of these journeys he died. Lanier's first published work was a novel, *Tiger Lilies*, which appeared in 1867 but met with little success. His poems, for which he is chiefly famous, are remarkable for their exquisite melody. He was one of the genuine poets of his generation, and his fame is growing steadily. Among his best-known poems are *Corn*, *The Marshes of Glynn* and the *Song of the Chattahoochee*.

Lan'sing, MICH., the capital of the state and the county-seat of Ingham co., 90 mi. n. w. of Detroit, at the junction of the Grand and Cedar rivers, on the Grand Trunk, the Michigan Central and several other railroads. The city occupies a level site and has broad and well-shaded streets. It was settled in 1837 and was laid out as the capital ten years later, when the place was still a comparative wilderness. The state capitol is a fine structure located in a twelve acre park near the center of the city. The state school for the blind and the state industrial school for boys are located here, and the state agricultural college, with its farm of 675 acres, is near the city. Other important structures are the city hall, the high school, the public library, a hospital and the Federal building. The Grand River has a fall of eighteen feet and furnishes good water power. The manufactures include flour, stoves, automobiles, agricultural implements, artificial stone, machinery, condensed milk, beet sugar and knit goods. The city has about twenty churches and an excellent public school system. Population in 1910, 31,229.

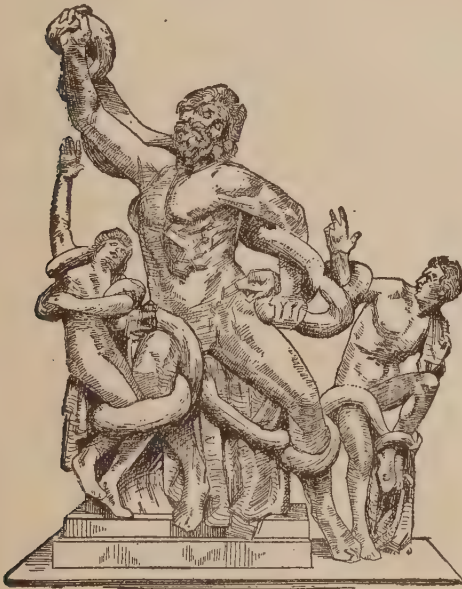
Lantern Fish, a name applied to a number of different deep sea fishes, some of which are of remarkably grotesque appearance. They are called lantern fish because they possess organs which give the light necessary for them to see by in the great depths at which they live.

Lantern Flies, insects allied to the cicadas, but forming a family by themselves. The

Laocoon

lantern fly proper is a native of South America. It is more than three inches in length and five inches across the wings. It is reported to fly only during sunlight and not to appear abroad during dark. The name is probably given these insects solely on account of the shape of their heads.

Laocoon, *la ok'o on*, in ancient Greek legend, a Trojan priest of Neptune. Near the close of the Trojan War, when the Greeks tried to introduce into Troy the wooden horse, Laocoön protested strongly and perhaps might have convinced his countrymen of his wisdom had not a serious accident occurred. Two enormous



LAOCOÖN
Now in the Vatican

serpents glided up from the sea and, winding themselves about Laocoön and his two sons, crushed them to death. This was regarded by the Trojans as a sign that Laocoön had been guilty of sacrilege in doubting the sacred character of the wooden horse. This story serves as the subject of various sculptures, chief among them a group discovered in 1506 and now in the Vatican. See **WOODEN HORSE**.

La'odami'a. See **PROTESILAUS**.

La Paz, *lah pahs'*, a town of Bolivia, since 1908 the capital of the country. It is more than 12,000 feet above sea level. The city is built in amphitheater form, is the seat of a bishopric and has a cathedral and a university. It is a place of considerable wealth and impor-

Lapland

tance. Most of the inhabitants are Aymara Indians or are of mixed race. Population in 1909, 78,856.

La'pis Laz'uli or **Lazurite**, a mineral composed of silica, aluminum, iron and several less important substances. It occurs in crystals and in massive form. It is found in granite and crystalline limestone. The best qualities are obtained from China, Siberia, Persia and Chile. This stone was prized by the ancients for its supposed medicinal properties and was used by the Egyptians for jewelry. Fine specimens were also used for vases, inlaid work and mosaics. When ground into powder and mixed with oil, it makes ultramarine, but the supply of this color is now obtained by an artificial process. See **PRECIOUS STONES**; **ULTRAMARINE**.

Laplace, *lah plas'*, **PIERRE SIMON**, Marquis de (1749-1827), the greatest of French astronomers. His parents were very poor and unable to give him an education, but through the assistance of influential friends he was enabled to go to school, and at the age of twenty he became professor of mathematics in the military school, through the influence of D'Alembert, who was his patron. He is especially known by his important work in regard to improvements of the lunar theory, the question of tides and the stability of the solar system. His greatest work was a complete solution of the problem of the solar system, one of the most important contributions to science (See **NEBULAR HYPOTHESIS**). In physics, also, he made many important experiments.

Lap'land, the land of the Lapps, an extensive territory in the north of Europe, between 85,000 and 90,000 square miles in area. Of this territory more than half belongs to Russia, and the remainder is shared, in nearly equal proportions, between Sweden and Norway. The climate for nine months is excessively cold; spring and autumn are short, and the summer of two months is extremely hot. Vegetation is scanty, except in the form of birch, pine, fir and the mosses which supply food for the herds of reindeer. The Laplanders are a small, muscular, large-headed race, with high cheek bones, wide mouth, flat nose and scanty beard. Many of them are nomadic, owing their subsistence to their herds of reindeer; others support themselves by fishing. They are generally ignorant, simple-hearted and hospitable. The Norwegian Laplanders belong to the Lutheran, and the Russian Laplanders belong to the Greek Church. Their numbers do not exceed 30,000.

La Plata, *la plah'tah*, a city of the Argentine Republic, 32 mi. s. e. of the city of Buenos Ayres, with which it is connected by rail. Founded in 1882 as the capital of the State of Buenos Ayres, it has already become an important city, having a palace for the legislative assembly, a cathedral, law courts, a theater, a public park and a system of public and private schools. Population in 1911, 100,608.

La Plata, RIO DE. See PLATA, RIO DE LA.

La Porte, *la port'*, IND., the county-seat of La Porte co., 12 mi. from Lake Michigan and 59 mi. s. e. of Chicago, on the Lake Erie & Western, the Lake Shore & Michigan Southern and other railroads. The city is in a farming region, and its manufactures include woolen goods, agricultural implements, wheels and other articles. There are beautiful lakes in the vicinity, and the place has become an attractive and popular summer resort. It was settled in 1830 and was chartered as a city in 1852. Population in 1910, 10,525.

Lap'wing, a handsome bird, belonging to the plover family. The common lapwing is a well-known bird about the size of a pigeon and is often called the peewit, from its peculiar cry.



LAPWING

This is a European bird, whose eggs are esteemed a great luxury and are gathered and sent to the markets. Its back is glossy green; head and neck and delicate crest, black; breast and under parts, white. Other species are found in Asia and South America.

Laramie, *lar'a me*, WYO., the county-seat of Albany co., 56 mi. n. e. of Cheyenne, on the Big Laramie River and on the Union Pacific railroad. It is a thriving city, located on an elevation of over 7000 feet, in the neighborhood of rich deposits of coal, iron, lead and other minerals. The city has extensive railroad shops, rolling mills, soda works, flour mills and glass works. Laramie is the seat of the state univer-

sity, the state agricultural college, a United States Agricultural Experiment Station and the state fish hatchery, and is the see of the Protestant Episcopal bishopric of Wyoming. The railroad company started the first sale of lots in April, 1868, and in less than two weeks many buildings had been constructed and the rapid growth of the city had begun. Population in 1910, 8237.

Laramie Mountains, a range of the Rocky Mountains which extends through southeastern Wyoming and into Colorado. The highest point is Laramie Peak, 10,000 feet high. Coal is found in abundance.

Larceny, *lahr'se ny*, the fraudulent appropriation of the property of another person without that person's consent. To constitute this crime the removal of the goods to any distance is not necessary, but the article must completely pass, for however short a time, into possession of the criminal. The common law restricted the classes of things the appropriation of which is larceny, to personal property, but this distinction has been largely abolished by recent statutes. Larceny was formerly divided into two kinds, *grand* and *petty*, according to the value of the thing stolen, but the distinction is now abolished in almost all the states. The penalty varies, but in ordinary cases a person convicted of larceny is generally liable to imprisonment with hard labor for not more than two years; on second conviction not more than ten, nor less than four. See ROBBERY; BURGLARY.

Larch, the common name of a genus of trees belonging to the cone-bearing family, but not themselves fragrant. In New England and Canada the native species is known as *hackmatack*, and in the western and southern states the same tree is known as *tamarack*. This American larch often grows to a height of seventy feet in swampy places, where the soil is deep. It has a slender trunk and horizontal branches which are covered with fine, needle-like leaves that fall in autumn. The small cones turn to a beautiful deep red before they ripen. The wood, which is compact and durable, heavy and difficult to burn, is valued for fence posts, railroad ties, telegraph poles, and in shipbuilding.

Lar'com, LUCY (1826-1893), an American poet, born in Beverly, Mass. As a Lowell factory girl, she attracted the favorable attention of Whittier by her contributions to a little paper conducted by the operatives in the cotton mills. She was afterwards educated in the Monticello Female Seminary in Illinois and then taught school in Massachusetts. She was editor of

Lard

Our Young Folks, a Boston magazine, and published *Childhood Songs* and *Wild Roses of Cape Ann and Other Poems*. Her poems of New England life were especially effective, and *Hannah, Binding Shoes* became the best known.

Lard, the fat of the hog. Lard is obtained by extracting it from the fatty portions of the carcass, in kettles heated by steam. It is clarified by heating to a high temperature, straining and then cooling by refrigeration. Just before it solidifies, the lard is run into pails, barrels or other vessels for marketing. The best quality is found in the fat which surrounds the kidneys, and this is employed in pharmacy for the preparation of ointments. When subjected to pressure the oleine is liberated, forming lard oil, which is much used as a lubricant for machinery. Lard is used in cooking, in the manufacture of soap and for many other purposes.

Laredo, *la ray'do*, Tex., the county-seat of Webb co., 140 mi. s. w. of San Antonio, on the Rio Grande and on the International & Great Northern, the National of Mexico and other railroads. The city is in a fertile agricultural and stock-raising district of Texas and is an important shipping point between the United States and Mexico. Grape culture and the raising of vegetables are the most important industries. There are valuable coal mines in the vicinity, and the city contains car and machine shops, brick and tile works, tanneries, foundries and other factories. Laredo has a fine courthouse and jail, the Mexican National and Mercy hospitals, Ursuline Convent and is the seat of Laredo Seminary and Ursuline Academy. The place was settled by the Spaniards in 1767 and was first incorporated in 1848. Population in 1910, 14,855.

Lares, *lay'reez*, and **Penates**, *pe nay'teez*, the inferior Roman gods who presided over the home and over families. The Penates were regarded as having been gods from the beginning, while the Lares were human beings who had died and returned to watch over their friends or descendants. As far as the two classes of deities had separate provinces, it was believed that the Penates protected the interior of the home and watched over its happiness, while the Lares guarded it from danger from without. These deities were usually worshiped in the form of small images, which were held as the most sacred possessions of the household. When a family moved, it took with it its Lares and Penates and provided a place for them before the welfare of the family was looked after.

Larva

They were usually kept in the atrium (See ATRIUM).

Lark, a song bird related to the finches, having a strong, short bill, nostrils covered with feathers, forked tongue and the power to raise the feathers on the back part of its head into the form of a crest. Larks are found generally distributed over the old world, but the only species in America is the shore lark. The larks live upon the ground, feeding on worms and larvae, and bring forth two broods in a year. The best known is the *English skylark*, which is celebrated for the prolonged beauty of its song, which it utters as it rises high in the air in spiral flight. It usually sings early in the morning and only during the nesting season. No bird has been more celebrated by poets than this, and Shelley's *Ode to the Skylark* is one of the most beautiful poems in the English language. A few of these birds have been introduced into the United States, and some are now living wild on Long Island and elsewhere in the East.

Larkspur, the common name of a genus of plants belonging to the buttercup family. Some medicinal properties are possessed by several species, but they are cultivated principally for their handsome, irregular flowers, which grow in large open clusters or in spikes. One hundred or more species are found wild in the United States, but the most beautiful kinds are natives of Asia. Gardeners have produced beautiful double flowers with a great variety of coloring.

La Rochefoucauld, *lah rohsh'foo ko'*, FRANÇOIS, Duc de, Prince de Marillac (1613-1680), a distinguished French courtier and man of letters. As a military officer he appeared at the court of Louis XIII, but was suspected by Richelieu of favoring the party of Queen Anne of Austria and was exiled to Blois. After the death of Mazarin he became reconciled with the court and played a brilliant rôle there. His *Mémoires* and his *Maximes*, published anonymously in 1665, are his chief writings. The latter work, for its brilliancy of style, is still considered a French classic.

Larva, *lah'va*, a name used to denote, in natural history, the first stage in the metamorphosis of insects and the early form of any animal, in which there is little resemblance to the parent. In the latter sense the tadpole is the larva of the frog. In insects this is the grub or caterpillar stage. When the insect first appears, it is usually in the form of a maggot, or small worm, as it is popularly, though wrongly, called. The larval stage is usually the active stage of

Larynx

insect life, during which the animal accomplishes most of its growing. From time to time the larva sheds its skin to permit of greater growth. See METAMORPHOSIS; INSECTS; also CATERPILLAR.

Larynx, *lar'inks*, the organ of voice, situated between the hyoid bone and the upper part of the trachea, communicating with the pharynx above and the trachea below. It is composed of nine cartilages, one *thyroid*, one *cricoid*, one *epiglottis*, two *arytenoid*, two *cornicular laryngis* two *cuneiform*. The cricoid cartilage has the shape of a signet ring, with the broad part toward the back of the throat, and is attached by fibrous tissue to the upper part of the trachea. The two arytenoid cartilages are placed on top of the wide part of the cricoid, with which they articulate in a movable joint. The vocal membranes are attached to them. The two halves of the largest cartilage, the thyroid, meet in an angle in front, but its sides do not form a complete ring. The projection of this cartilage is known as *Adam's apple*. The epiglottis is attached to the top of the thyroid in such a manner that it may close the opening from the pharynx to the larynx during the act of swallowing. The vocal cords are two membranes which extend from the arytenoid cartilages across the larynx to the thyroid. They may be compared to the head of a drum, the membrane of which has been slit across the middle. The length and tension of these membranes are controlled by the movements of the arytenoid cartilages. In quiet breathing the slit, called the glottis, is wide open, being narrow in front and wider behind. A set of muscles pulls the arytenoid cartilages backward, thus stretching the vocal cords; another set pulls the same cartilages toward the thyroid cartilage, making the vocal cords slack; a third set pulls the arytenoids toward each other, making the glottis narrower behind, while a fourth set has an opposite effect. The space above the vocal cords is triangular in shape, and its mucous lining, just above them, makes on each side a fold known as the false vocal cords. The ventricle of the larynx lies between the true and the false cords. See VOICE.

La Salle, *la sal'*, **ILL.**, a city in La Salle co., 99 mi. s. w. of Chicago, on the Illinois & Michigan Canal and on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific and the Illinois Central railroads. It lies on high bluffs along the Illinois River, near productive bituminous coal fields, and has a large trade. The other important industries are zinc smelting

Las Casas

and the manufacture of cement, brick, sulphuric acid, implements, clocks and glass. The city has a public library, a township high school and several hospitals, and is the seat of Saint Bede College. The place was settled in 1830 and was named in honor of La Salle, the explorer. Population in 1910, 11,537.

La Salle, **RENÉ-ROBERT CAVELIER**, Sieur de (1643-1687), a French explorer in America. He went to Canada early in 1666, and from there he conducted many expeditions. In 1669 he descended the Ohio to the site of Louisville and later explored the regions of the Great Lakes.



LA SALLE

Finally he set out to explore the Mississippi and was the first to follow the river to its mouth. He established Fort Saint Louis, on the Illinois River, and, returning to France, was made commandant of all the country which he had found. On another voyage he tried to find the mouth of the Mississippi, but failed; his party was scattered, and he was shot from ambush by a mutinous soldier.

Las Casas, *las kah'sas*, **BARTOLOMÉ DE** (1474-1556), a Spanish prelate, known as the "Apostle of the Indies." He went to Hispaniola in 1502 and on the conquest of Cuba received charge as priest there and distinguished himself for his humane treatment of the natives. In the cause of religion he visited various parts of the New World, including Mexico, Guatemala and Peru. In 1542 he wrote his famous *Brevisima relacion*

Lassa

de la destruycion de las Indias. He was made bishop of Chiapas in 1544, but three years later returned to Spain.

Lassa, *lahs'sah*. See **LHASA**.

Lassalle, *la sal'*, **FERDINAND** (1825-1864), a German socialist, educated at Berlin University. He first made himself known as a leader during the democratic troubles of 1848 and was imprisoned for a year. In 1861 he published his *System of Acquired Rights*. Thereafter he organized the working classes, which caused the government to accuse him of sedition, and he was imprisoned for four months. In May, 1863, he founded a labor union and began that socialist propaganda which has since become so widespread in Germany.

Las'so, a contrivance used in Spanish America and in the Western states of the Union, consisting of a long rope of plaited rawhide, at one end of which is a small metal ring. By means of this ring a noose is readily formed, and the lasso, or *lariat*, is then used for catching wild animals, the rope being cast over the animal's head or leg while the hunter is in full gallop. Most remarkable skill is acquired by those who use the lasso, which is the constant companion of the "cowboy" on the great cattle ranges of the West.

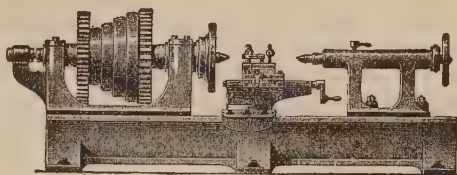
Las Vegas, *las va'gas*, N. M., the county-seat of San Miguel co., 40 mi. directly e. of Santa Fé, on a branch of the Pecos River and on the Atchison, Topeka & Santa Fé Railroad. The city is composed of two parts, the old Mexican settlement and the modern city, known as East Las Vegas until it was incorporated as the city of Las Vegas in 1896. The city is located just between the Rocky Mountains and the plains. It has a large trade in wool and contains wool scouring works, flour mills, wagon shops, foundries, breweries and other factories. The city contains the New Mexico Normal University, a public library, the Castaneda Hotel and many fine buildings. The famous Las Vegas hot springs are six miles from the city. There are about forty of these springs, and on account of their curative properties they have become a favorite resort for invalids. It is to these springs that the fame of Las Vegas is largely due. Population in 1910, about 6934.

Lat'eran, one of the churches at Rome, built originally by Constantine the Great and dedicated to Saint John of Lateran. The site on which the buildings stand originally belonged to Plautius Lateranus, who was put to death by Nero. The Lateran is the episcopal church of

Lathrop

the pope and the principal church of Rome. It has a palace, now used as a museum of statues and antiquities, and other buildings annexed to it. Every newly-elected pope takes solemn possession of the church, and from its balcony he bestows his blessing on the people. The palace and the church belong absolutely to the popes, having been given them by the Italian government in 1871. Pope Leo XIII and many of his predecessors are buried in the Lateran.

Lathe, *layth*, a machine for turning and polishing flat, round, cylindrical and oval objects



LATHE

of wood, ivory or metal. The object worked receives a rotary motion. The important parts of the lathe are the frame, the balance wheel, the two heads, to which the object to be turned is fastened, and the rest for the chisel. One head slides in the grove in the frame and can be firmly fastened at any point by a screw. This admits of turning articles of different lengths. A belt passes from the balance pulley over another in the head and imparts the motion. A series of pulleys of different sizes on the balance wheel and head enable different rates of speed to be maintained. A lathe for turning wood has a much higher speed than one for turning metal. The tools used are chisels made especially for the purpose. Small lathes are often run by foot power, but large ones use steam or electric power.

Lathrop, **JULIA CLIFFORD** (1858-), an American social settlement worker. She was born at Rockford, Ill., studied at Rockford College, and later at Vassar College, where she took her degree in 1880. Her chief interest was in the care of the insane, and she visited European institutions and made a study of the methods in use there; but other departments of philanthropic work also claimed her attention, and she helped to establish the Chicago juvenile court and the Chicago School of Civics and Philanthropy. Much of her time after 1899 was spent as a worker at Hull House, in Chicago. In 1912 she was appointed chief of the Federal Children's Bureau, which is to investigate matters pertaining to the welfare of children.

Lat'imer, HUGH (1490-1555), an English prelate, reformer and martyr. He was educated in Cambridge, was made chaplain to Henry VIII in 1530 and during the ascendancy of Anne Boleyn in 1535 he was appointed bishop of Worcester. In 1539 he resigned his bishopric, not being able to accept the Six Articles, and lived in privacy for six years. On coming to London, he was put in prison, but on the accession of Edward VI was released and became highly popular at court. This continued until Mary ascended the throne, when Latimer was cited to appear, along with Cranmer and Ridley, before a council at Oxford. He was condemned, and after much delay and a second trial, Latimer and Ridley were burned at the stake, Oct. 16, 1555.

La'tin Language. Latin is a branch of the Indo-European, or Aryan, family of languages. It was spoken by the people of central Italy perhaps as early as 1500 B. C. In the period of the Roman Republic and the Empire it received its literary form, and it is to the language of that time the designation *classical* is given. During the last two centuries of the Empire, Latin became much corrupted through contact with other languages, and this process was still more marked after the fall of Rome. By the eighth century it had ceased to be a generally spoken tongue, and in the several countries where Roman civilization had been established, it had developed into the several tongues which have survived in the modern Romance languages. The chief representatives, besides Italian, are French, Spanish, Portuguese and Rumanian. In Great Britain the effect upon the language of the first contact with Latin was not considerable, owing to the early extinction of Roman supremacy there and the overpowering inroads of Germanic tongues. Of the large proportion (about three-sevenths) of words of Latin origin in the English language, the most came in through the Norman Conquest (See ENGLISH LANGUAGE).

It is to be noticed that the Romance tongues are descended, not from classical Latin, but from what is known as folk-Latin, the corrupted idiom of later popular speech. During the Dark Ages, Latin continued, in a corrupted form, to be the language of the Church, law and learning, and in some countries it remained so until within two centuries. In still later times it was employed, restored to its classical form, in learned writings and as a means of international communication. It was the clergy who pre-

served the Latin language and literature in the Dark Ages, and to the convents were carried the remnants of the libraries.

In structure and vocabulary Latin is more closely related to Greek than to any other Indo-European language, an interesting evidence of the probably close relationship of the two races. The Latin language is remarkable for its accuracy of expression and its perfect mechanical structure. It was, indeed, well fitted for its important service in the law. As Latin has never ceased to be spoken as a learned language, its pronunciation has followed in general the principles governing the language of each country in which it is used. In America a method known as the *Roman* is, however, now almost universal in the universities, colleges and high schools of the country. This is an attempt to attain to the real pronunciation of Latin in the time of Cicero. The vowels are pronounced almost as in Italian, but the consonants as in English, with the exception that *c* and *g* are always hard; *r* is trilled; *s* is voiceless; *z* is like *dz*; *ph*, *th* and *ch* are really aspirated consonants. In England the *English method* is still used in the schools, the Latin words being pronounced as if they were English.

Lat'itude, in geography, the distance of any place on the globe north or south of the equator, measured on its meridian. It is called *north* or *south*, according as the place is north or south of the equator. The highest or greatest latitude is 90°, that is, at the poles; the lowest or smallest, 0°, at the equator, between which and the poles any number of parallel circles called *parallels of latitude* may be supposed to be drawn. One method of finding the latitude of a place is by measuring the altitude of the polar star, the latitude of the observer being equal to the altitude in degrees of the star above the horizon. When the latitude and longitude of a place are given, its position on a map is easily found (See LONGITUDE). Certain parallels of latitude are more noteworthy than others. See ANTARCTIC CIRCLE; ARCTIC CIRCLE; EQUATOR; TROPICS.

Latium, *la'she um*, the ancient name of a district of Italy, on the Tyrrhenian Sea, extending between Etruria and Campania and inhabited by Latins, Volsci, Aequi and other peoples.

Latour D'Auvergne, *la toor' do vair' ny'*, THEOPHILE MALO CARRET DE (1743-1800), a French soldier. Entering the military service in 1767, he became aid-de-camp to the duke of Crillon and distinguished himself at the

siege of Port Mahon. When the revolution began he was a captain of grenadiers and as, in spite of his meritorious services, he refused higher positions, he was named *First Grenadier of France* by Napoleon. He commanded a corps of eight thousand men, which was known as the *infernal column*. He fell at Neuburg, Switzerland, June 27, 1800.

Lat'terday Saints, officially The Reorganized Church of Christ of Latter Day Saints, a religious body which claims to be the true successor of the Mormon Church established by Joseph Smith. It has about 1,600 active ministers and a membership of over 65,000. The headquarters are at Lamoni, Iowa, and the present head of the church is Frederick Smith, grandson of Joseph Smith, the founder of the Mormon Church. The reorganized church has no connection with the Mormons. See MORMONS.

Laud, WILLIAM (1573-1645), archbishop of Canterbury in the reign of Charles I, born at Reading in Berkshire. He was educated at Saint John's College, and took priest's orders in 1601. He became unpopular with the university authorities because he was so opposed to Puritanism. He filled many positions, was made archbishop of Canterbury in 1633 and was twice offered the cardinal's hat. As archbishop he instituted rigorous proceedings against all who would not conform to the Church of England. By means of spies he hunted out the Puritans, and he sought to extinguish all forms of dissent through fines, imprisonment and exile. When the Long Parliament met (1640), the archbishop was impeached for high treason. The House of Commons passed a bill of attainder (1644) and declared him guilty of high treason. He was beheaded on Tower Hill.

Lau'danum or **Tincture of O'pium**, a brownish-red fluid, prepared from opium and having the qualities of that drug, but in a milder degree. It is a frequent ingredient of "soothing syrups" for infants and is sometimes given to relieve colic and pains. Its use, however, is liable to be very injurious, and it causes not a few deaths among infants. See OPIUM.

Laughing, *lahf'ing*, **Gas**, nitrous oxide or nitrogen monoxide or protoxide of nitrogen; so called because, when inhaled, it usually produces exhilaration. It is administered by dentists to deaden pain and produce unconsciousness during the extraction of teeth, as its effects are usually less severe than those of ether or chloroform. See NITROGEN.

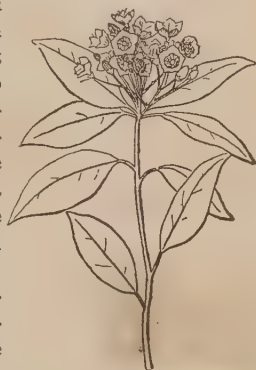
Laughlin, *lah'lin*, JAMES LAURENCE (1850-

), an American economist and educator, born at Deerfield, Ohio. He graduated at Harvard in 1873, taught in the public schools of Boston and later as instructor and assistant professor in political economy at Harvard. In 1890 he became professor of political economy at Cornell. Two years later he accepted a similar position at the University of Chicago. As a member of the monetary commission, he took an active part in its discussions and wrote a report of the greatest value. Among his published writings are *The History of Bimetallism in the United States*, *Elements of Political Economy* and *Facts About Money*.

Laureate, *law're ate*, POET, a name first applied to poets who were honored by the gift of a laurel wreath. It is now the title of an official of the royal household of Great Britain, the patent for which appears to have been granted by Charles I in 1630, although Ben Jonson and others are said to have held the title previously. Since the reign of George III, there have been no special duties connected with the office. From the time of Charles II the following poets have held the office of laureate: John Dryden, Thomas Shadwell, Nahum Tate, Nicholas Rowe, Lawrence Eusden, Colley Cibber, William Whitehead, Thomas Warton, Henry James Pye, Robert Southey, William Wordsworth, Alfred Tennyson, Alfred Austin and Robert Bridges. The salary is \$360 a year.

Lau'el. The sweet bay, or laurel, is a native of the north of Africa and south of Europe and is cultivated in gardens, not only on account of its elegant appearance, but also for the aromatic fragrance of its evergreen leaves. The fruit, which is of a purple color, and the leaves, have long been used in medicine. The common, or cherry, laurel, the Portugal laurel and the spurge laurel are very different from the true laurel.

The name is also given to other plants, as in America to species of rhododendron and other plants having thick leaves of a dark, glossy green. In ancient times heroes and scholars were crowned with wreaths of bay leaves, and thus the terms *laurels*, *bays* and *laureate* came to



LAUREL

Laurens

be significant of honor. From the fruit of the sweet bay, or laurel, several oily substances have been extracted; the cherry laurel yields a volatile, poisonous oil when its leaves are distilled in water.

Lau'rens, HENRY (1724-1792), an American soldier and patriot, born in Charleston, S. C., of Huguenot descent. He entered business at Charleston, but retired in 1771 and spent several years in European travel. He believed in the validity of the Stamp Act and opposed forcible opposition to the intolerable acts of 1774, but he nevertheless became active in the struggle against Great Britain, was elected to the second Continental Congress and presided over it after Nov. 1, 1777. He resigned in the following year, and in 1779 he was sent to Holland to frame a commercial treaty. He was captured by the British and imprisoned in London Tower for more than fifteen months. After his release he became one of the American peace commissioners and signed the Treaty of Paris in 1783.

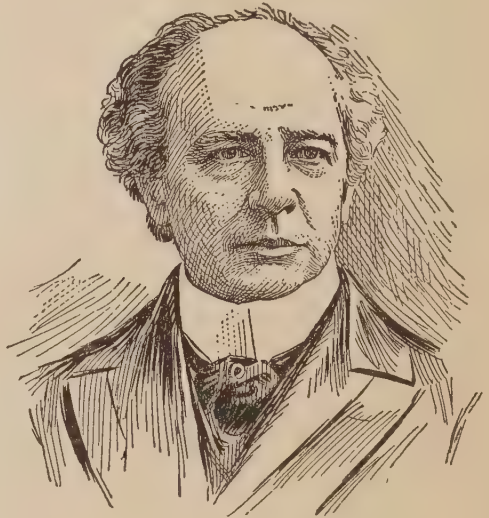
Laurens, JOHN (1753-1782), an American soldier, son of Henry Laurens, born in South Carolina and educated in England. He became an aide to Washington in the Continental Army in 1777, participated in almost all of Washington's great battles and was several times wounded. In 1781 he was sent to France, where he succeeded in negotiating a loan in spite of his independence of diplomatic forms. Returning to America, he fought at Yorktown and in the following year was killed in one of the minor skirmishes of the Southern armies. He has been called the "Bayard of the Revolution," on account of his patriotism, gallantry and uniform courtesy and kindness.

Laurentian, law ren'shan, Mountains, a range of highlands or mountains in Canada, extending for over 3000 miles from Labrador to the Arctic Ocean, forming the watershed between Hudson Bay, the Saint Lawrence and the Great Lakes, and dividing Hudson Bay from the sources of the Mackenzie River. The average elevation is about 1500 feet, while some of the peaks attain a height of over 3000 feet.

Laurier, lo re ay', WILFRID, Sir (1841-), a Canadian statesman, born at Saint Lin, Quebec. He was educated at L'Assomption College and McGill University and was admitted to the bar in 1864. For a short time he was editor of *La Deffricheur*, then became member of the Quebec Assembly. In 1874 he was elected to the Dominion Parliament and became minister of internal revenue in 1877. Upon the retirement

Lausanne

of Mr. Blake, Laurier became leader of the Liberal party, and from 1896 to 1911 he was premier of the Dominion, being the first French-Canadian to hold the office. Canada was ex-



SIR WILFRID LAURIER

ceedingly prosperous and progressive during his term. In 1898 he was appointed a member of the Anglo-American Joint High Commission. His eloquence and magnetism earned for him the sobriquet of "silver-tongued Laurier." He was very friendly toward the United States.

Laurium, MICH., a village in Houghton co., 17 mi. n. e. of Houghton, on the Mineral Range and the Copper Range railroads. Laurium is on the Keweenaw peninsula and in the midst of one of the richest copper regions in the United States and in the world. The chief occupation is the mining of copper, and the industries directly connected with this are of considerable importance. There are also mattress, clothing and cigar factories. Laurium and Red Jacket, which is also an important mining center, are situated in the township of Calumet. Formerly the name Calumet was applied to the villages and townships alike, but in 1895 the name Laurium was given the chief village. Population of the village in 1910, 8537; of Calumet township, 32,845.

Lausanne, lo zahn', a town in Switzerland, capital of the canton of Vaud, on the slopes of Mont Jorat, about $\frac{1}{2}$ mi. from the Lake of Geneva. Lausanne is built on three hills, two of which are connected by a lofty viaduct, and the most interesting building is the Gothic cathe-

Lava

dral, erected in the thirteenth century. Lauseanne is of little trade or commercial interest, but it is much visited by tourists, and its educational institutions attract many foreign pupils. In 1875 it became the seat of the supreme court of the Republic. Population in 1910, 63,926.

Lava, *lah'va*, the general name for all rocky matter which flows or has flowed in a molten state from volcanoes and which, when cooled, forms varieties of tufa, trachyte and basalt, according to the proportions of feldspar, hornblende and augite which enter into its composition. The texture of rocks formed from lava depends upon the rapidity with which the mass has cooled. When cooled rapidly the lava forms a compact rock. If cooled slowly, the rock is porous and often brittle and easily crumbled. Lava beds occur in two forms, those which have been deposited by the overflow of volcanoes, and are found on the sides and at the base of the mountains, and those which have been forced up between other layers of rock and have cooled in this position. Such beds often outcrop at the summits of mountains or at high altitudes upon their sides. See VOLCANO.

Laval', a town of France, capital of the Department of Mayenne, 45 mi. e. of Rennes. It is an interesting and picturesquely situated place, and among its principal edifices are the cathedral, the episcopal palace and an ancient castle, now a prison. The manufactures consist of damasks and other linen goods, flannels, leather, machinery and marble products. Population in 1911, 30,300.

Laval-Montmorency, *lahval'mohN mo rahN-see'*, FRANÇOIS XAVIER DE (1622-1708), a French churchman, born at Laval. He became a priest at twenty-three and a few years later became archdeacon of Evreux. In 1659 he was sent to Canada, as a special envoy of the pope, and established the Seminary of Quebec, besides actively engaging in the upbuilding of French and Catholic influence in the region. Laval University, Quebec, was named in his honor.

Laval University, a French educational institution, established at Quebec in 1852, under the auspices of the Roman Catholic Church. It maintains departments of theology, law, medicine and arts. The faculty numbers over fifty, and there are about 400 students. The library contains 140,000 volumes, and the museum has one of the most complete collections of Indian relics in America.

Lav'ender, a fragrant shrub, three or four feet high, which is a native of the south of Europe.

Law

From the flowers of the lavender is extracted an oil which is much in demand as a perfume. The oil is pale yellow, with an aromatic odor and a hot taste, and it is used as a stimulating medicine. Lavender water is a solution of oil of lavender, flavored with attar of roses, bergamot, musk, cloves or other preparation. Florida water, a favorite American perfume, is largely prepared from lavender.

Laveran, *la v' rahN'*, CHARLES LOUIS ALPHONSE (1845-), a French physician, noted for his investigations into the cause and treatment of malarial fever. In carrying out his plans, he resided for five years in Algeria and then returned to France. He discovered the plasmodium which is the cause of malaria and thus, with Patrick Manson, opened the way to the intelligent treatment of that disease. In 1907 he received the Nobel prize for medicine.

Lavoisier, *la vvah syay'*, ANTOINE LAURENT (1743-1794), a celebrated French chemist. His first public distinction was to receive the prize for the best essay on lighting the streets of Paris. He was the first to organize the methods of chemistry and establish its terminology. He was guillotined in the Reign of Terror.

Law, in government, a rule of conduct prescribed by a competent authority; the body of all such rules, and the science which investigates and treats of them. Law in the first and second meanings given above originated in custom, in the precedents of the action or forbearance from action of individuals, kinsmen, tribes and, finally, of the community as a whole, or society. Eventually, the necessity of establishing tribunals for settling controversies became apparent, and the decisions of these tribunals gave to precedent a much greater force and eventually practically established laws by declaring what previous custom had been. Gradually these tribunals or courts evolved a new set of rules, not founded entirely upon precedent, but upon common sense and conscience. Here was the origin of the law of equity. It was not a long step from law making by judges to the establishment of a special law-making body, or legislature. Thus, the three great branches of law were developed, *common law*, or the law of custom; *equity*, or the law of right, and *statutory law*.

Law in its modern sense is said to be of two kinds, *substantive*, which deals with principles of right to be followed, and *adjective*, or *remedial*, which deals with procedure in case of violations, that is, with the arrest and trial of offenders. Substantive law is in turn divided into *public*

law, which deals with the state and its relations, and *private law*, which concerns private persons and property. Another division of public law is sometimes made. It is said to consist of *international law*, or the law recognized between nations, *constitutional law*, which regulates the organization and the relations of the parts of a single state, and *administrative law*, which regulates the procedure of the various organs of government. Adjective or remedial law has to do not only with civil and criminal procedure, but with the classification of crimes and penalties. This article treats only of the fundamental principles and the general organization of the subject of law. The many variations in the treatment and framing of laws by different nations and races cannot be profitably discussed in this work. General statements of the important points of difference will be found in the articles upon the most important nations. See, also, CIVIL LAW; COMMON LAW; EQUITY; STATUTE; INTERNATIONAL LAW; PROCEDURE; COURTS; CRIME.

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Lawn Mower, a machine used for cutting grass on lawns. It consists of a set of spiral knives with blunt edges, so arranged that when the machine is pushed along they revolve rapidly and cut the grass by bringing it against a stationary knife. They do not work successfully in long grass.

Lawn Tennis, a modified form of an old English game, played with rackets and light

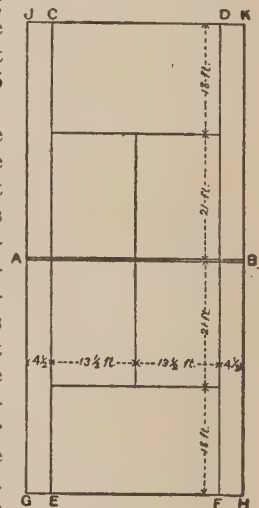
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LAWN MOWER

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TENNIS COURT

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Lawn tennis is an excellent game, requiring great activity and skill and giving vigorous exercise of the lighter type. It is played extensively by both sexes, and there are numerous local tennis associations, as well as a national association, which conduct popular contests.

Lawrence, KAN., the county-seat of Douglas co., 40 mi. w. of Kansas City, on the Kansas River and on the Atchison, Topeka & Santa Fé and the Union Pacific railroads. It is the seat of the state university (See KANSAS, UNIVERSITY OF) and of the Haskell Institute, a national industrial school for indians, which occupies a site of 600 acres. The city has many attractive buildings and conducts a large trade with the surrounding agricultural section. The manufactures include flour and paper mills, creameries, foundries, machine shops and wood-working establishments. Lawrence was founded by the Emigrant Aid Society in 1854, after the passage of the Kansas-Nebraska Bill, and was for a time the headquarters of the antislavery party in the territory. Population in 1910, 12,374.

Lawrence MASS., one of the county-seats of Essex co., 26 mi. n. w. of Boston, on both sides of the Merrimac River and on six lines of the Boston & Maine railroad. The Common, which is the largest public park, contains a fine monument in honor of the soldiers of the Civil War. Glen Forest, on the banks of the Merrimac, is a popular park resort. There are various



TENNIS RACKET

educational and numerous charitable institutions, besides a large public library. Prominent buildings include the city and county courthouse, a state armory, numerous factories and the Odd Fellows' Building.

The first settlement was probably made here about the middle of the seventeenth century, but the modern city dates from the construction of the great dam across the Merrimac. The city has long been known for its extensive manufactures of cotton and woolen goods, including shirtings, calicoes, flannels, broadcloths and other goods. There are various other establishments, including paper mills, foundries and carriage, engine, sewing machine and other factories. The town was incorporated in 1847 and was chartered as a city in 1853. Population in 1910, 85,892.

Lawrence, AMOS (1786-1852), an American merchant and manufacturer, born in Groton, Mass. In partnership with his brother Abbott, he established in Boston a very large dry goods business, which became the leading wholesale mercantile establishment in the country. He also was influential in the upbuilding of the cotton manufactures at Lowell and Lawrence, Mass. In 1831 he retired and engaged in acts of benevolence, expending \$640,000 for charitable purposes.

Lawrence, JAMES (1781-1813), an American naval officer, born at Burlington, N. J. In 1798 he entered the United States navy as midshipman. He served under Commodore Bainbridge in the War of 1812 and as commander of the *Peacock* captured the *Hornet*. This victory gained for him the command of the *Chesapeake*. But a few days after taking command of this ship he engaged in battle with the British ship *Shannon*; his ship was captured and he was killed. While he was being carried below he said, "Don't give up the ship," words which were afterward adopted as a motto in the navy.

Lawrence, JOHN LAIRD-MAIR, Lord (1811-1879), governor-general of India. His rare administrative ability as chief commissioner of the Punjab enabled him to obtain such an influence over the Sikhs that in the Indian Mutiny of 1857 he was able not only to keep the Punjab quiet, but to collect native forces and send them to assist in the capture of Delhi. His services were rewarded by an appointment to the governor-generalship of India in 1863, and later he was created Baron Lawrence.

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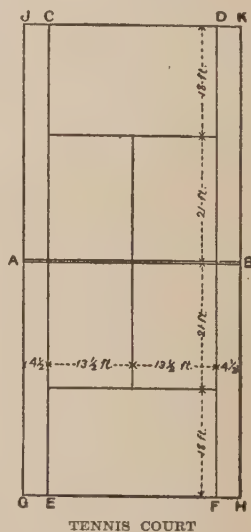
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At the beginning of the game one player takes the ball and *serves* it; that is, he throws it into the air and knocks it with the racket over the net and into the small square on the opposite side, near the net and diagonally opposite the server. It must be returned by the other player on the first bound after it strikes the ground. The server then returns the ball, either before it strikes the ground or on the first bound afterward. The player who first misses the ball or knocks it outside of the outside lines or fails to knock it over the net, loses the point. There are numerous rules which govern the niceties of plays, and these may be learned from a manual of the game.

Lawn tennis is an excellent game, requiring great activity and skill and giving vigorous exercise of the lighter type. It is played extensively by both sexes, and there are numerous local tennis associations, as well as a national association, which conduct popular contests.

Law'rence, KAN., the county-seat of Douglas co., 40 mi. w. of Kansas City, on the Kansas River and on the Atchison, Topeka & Santa Fé and the Union Pacific railroads. It is the seat of the state university (See KANSAS, UNIVERSITY OF) and of the Haskell Institute, a national industrial school for indians, which occupies a site of 600 acres. The city has many attractive buildings and conducts a large trade with the surrounding agricultural section. The manufactures include flour and paper mills, creameries, foundries, machine shops and wood-working establishments. Lawrence was founded by the Emigrant Aid Society in 1854, after the passage of the Kansas-Nebraska Bill, and was for a time the headquarters of the antislavery party in the territory. Population in 1910, 12,374.

Lawrence MASS., one of the county-seats of Essex co., 26 mi. n. w. of Boston, on both sides of the Merrimac River and on six lines of the Boston & Maine railroad. The Common, which is the largest public park, contains a fine monument in honor of the soldiers of the Civil War. Glen Forest, on the banks of the Merrimac, is a popular park resort. There are various



TENNIS RACKET

educational and numerous charitable institutions, besides a large public library. Prominent buildings include the city and county courthouse, a state armory, numerous factories and the Odd Fellows' Building.

The first settlement was probably made here about the middle of the seventeenth century, but the modern city dates from the construction of the great dam across the Merrimac. The city has long been known for its extensive manufactures of cotton and woolen goods, including shirtings, calicoes, flannels, broadcloths and other goods. There are various other establishments, including paper mills, foundries and carriage, engine, sewing machine and other factories. The town was incorporated in 1847 and was chartered as a city in 1853. Population in 1910, 85,892.

Lawrence, AMOS (1786-1852), an American merchant and manufacturer, born in Groton, Mass. In partnership with his brother Abbott, he established in Boston a very large dry goods business, which became the leading wholesale mercantile establishment in the country. He also was influential in the upbuilding of the cotton manufactures at Lowell and Lawrence, Mass. In 1831 he retired and engaged in acts of benevolence, expending \$640,000 for charitable purposes.

Lawrence, JAMES (1781-1813), an American naval officer, born at Burlington, N. J. In 1798 he entered the United States navy as midshipman. He served under Commodore Bainbridge in the War of 1812 and as commander of the *Peacock* captured the *Hornet*. This victory gained for him the command of the *Chesapeake*. But a few days after taking command of this ship he engaged in battle with the British ship *Shannon*; his ship was captured and he was killed. While he was being carried below he said, "Don't give up the ship," words which were afterward adopted as a motto in the navy.

Lawrence, JOHN LAIRD-MAIR, Lord (1811-1879), governor-general of India. His rare administrative ability as chief commissioner of the Punjab enabled him to obtain such an influence over the Sikhs that in the Indian Mutiny of 1857 he was able not only to keep the Punjab quiet, but to collect native forces and send them to assist in the capture of Delhi. His services were rewarded by an appointment to the governor-generalship of India in 1863, and later he was created Baron Lawrence.

Lawrence, THOMAS, Sir (1769-1830), an English painter, born at Bristol. He was the

son of an innkeeper and at an early age gave striking proof of his talent for art. George III made him court painter, and in 1815 knighthood was conferred on him. His portraits of notable persons are his best works. Among them are portraits of Pius VII, Mrs. Siddons, Benjamin West and George IV.

Law Schools, educational institutions for preparing students for the legal profession. The first law school established in America was at Litchfield, Connecticut, in 1784. This was an entirely independent institution and continued for about fifty years, when, in 1833, it suspended. During this time it was very influential, and many of its graduates came to occupy prominent positions in the state and national governments. The beginning of law schools as departments of the different colleges was in the form of courses of lectures on law, delivered in such institutions as the College of Philadelphia, Columbia and Harvard. Later, law departments were organized in these institutions, and these finally became law schools. In addition to schools of this nature, there are in the large cities of the country many independent law schools having courses similar to those connected with the universities. The standards for admission vary somewhat in different states. The best schools require a college course as preliminary to their work, and the law course occupies from three to four years. There are other schools that admit students without this preparation and do much more elementary work.

Lawsuit, law'sute. See PROCEDURE.

Law'ton, HENRY WARE (1843-1899), an American soldier, born at Manhattan, Ohio. He entered the Union army in 1861 and served during the Civil War, attaining the brevet rank of colonel. In 1866 he was commissioned second lieutenant in the regular army, and later he was made inspector-general, with the rank of major. At the beginning of the Spanish War he was promoted to the rank of brigadier general of volunteers and commanded the division that captured El Caney, July 1, 1898. The next year General Lawton was sent to the Philippines as second in command and rendered valuable service in putting down the Filipino rebellion. He was killed in an attack on San Mateo in December, 1899.

Lay'ard, AUSTEN HENRY, Sir (1817-1894), an English archaeologist, diplomatist and traveler. In 1839 and following years he traveled in the East and began his celebrated excavations on the site of ancient Nineveh. The

material which he discovered was sent to the British Museum, and the results of his search were described in his works, *Nineveh and its Remains* and *Nineveh and Babylon*.

Laz'arus (God hath helped). 1. The name of the beggar in the parable of the rich man and Lazarus (*Luke* xvi, 19-31). 2. The brother of Martha and Mary. Jesus raised Lazarus from the dead (*John* xi, 1-44).

Laz'urite. See LAPIS LAZULI.

Lead, led, a soft metal of bluish-gray color, which, when cut, has a bright metallic luster, but soon tarnishes on exposure to the air. Lead is about eleven and one-third times heavier than water and is easily indented or bent, but is not elastic. It is somewhat ductile and quite malleable, but it is not strong. Lead melts at a temperature about three times that of boiling water, but it contracts on solidifying, and for this reason it is not suitable for castings.

Lead ore is quite generally distributed, but it is found in paying quantities in only a few localities. The most important ores are the *sulphide*, or *galena*, sometimes known as *lead glance* (See GALENA), and the *carbonate*, which often contains considerable silver and copper. Such ore is worked for the different metals which can be obtained from it; hence, considerable silver is obtained in the reduction of lead ore, and considerable lead in the reduction of silver ore. The United States leads all countries in the production of lead.

Lead is used for lining tanks and tea chests, in the manufacture of lead pipe and in making numerous alloys and compounds, such as solder, Britannia metal, powder, shot and type metal, which is a compound of lead and antimony. A number of compounds of lead are also in general use. Of these, the oxides, *litharge* and *red lead*, are used in paints and the manufacture of glass, and the carbonate of lead, or *white lead*, forms the basis of many paints. *Lead acetate*, or *sugar of lead*, is used in coloring and sometimes for medicine. See LEAD POISONING.

Lead, an instrument used on shipboard for discovering the depth of water. It is composed of a large piece of lead, shaped like an elongated clock weight, from seven to eleven pounds in weight, and attached to a line, generally of twenty fathoms length, called the *lead line*. This is marked at certain distances to ascertain the depth in fathoms. When the depth is great, the *deep-sea lead*, weighing from twenty-five to thirty pounds, is used. The line, which is much longer than the former and is called the *deep-*

Lead

sea line, is marked by knots every ten fathoms and by a smaller knot every five fathoms. See **SOUNDING**.

Lead, lead, S. D., a city of Lawrence co., about 18 mi. from the western boundary of the state, on the Chicago, Burlington & Quincy and the Chicago & Northwestern railroads. It is the chief city in the mining center of the Black Hills. The famous Home Stake Mine, employing over 4000 men and producing about one-twelfth of the gold produced in the United States, is located here. Mining is the chief industry, but there are manufactories of mining tools, camp supplies and other products. The city has public and private schools, a business college, the Hearst Library, the Lead Coliseum and several churches. Population in 1910, 8392.

Lead, led, Gance. See **GALENA**.

Lead Poisoning is caused by the presence of lead in the system. Lead is often contained in water or other beverages which have been in lead pipes or vessels, and it is not infrequently found in confectionery which has been colored and in wine that has been sweetened by lead preparations. Sufficient lead may be taken from any one of these sources to cause more or less serious illness, but the most frequent and virulent cases occur among painters and persons engaged in white lead factories. The effects of poisoning may manifest themselves in severe colic or in a species of rheumatism, or, far more serious, in paralysis or, rarely, in brain diseases that terminate in delirium, convulsions and death. Opium and cathartics are the chief medicines used.

Leadville, led'vil, COLO., the county-seat of Lake co., about 80 mi. s. w. of Denver, on the Colorado Midland, the Denver & Rio Grande and the Colorado & Southern railroads. The city is picturesquely located at an elevation of 10,200 feet, between the Saguache and Mosquito ranges of the Rocky Mountains. Rich placers were discovered here in 1860 in California Gulch, but in a few years they were almost exhausted and the camp was practically abandoned, when, in 1877, rich silver and lead deposits were discovered. It then became widely known as a silver camp. After the decline in silver late in the nineteenth century, attention was again turned to gold mining, and for years the district has been a heavy producer of gold, also of zinc, copper, bismuth and manganese. The city contains large sampling, refining and reduction works and smelting furnaces. The principal business streets are "surfaced"; gas and

Lease

electricity are supplied by private enterprise, good public schools are maintained, and the city has two theaters, several hospitals, about a dozen churches and a Carnegie library. A United States fish hatchery is located here, and the government has recently erected a commodious postoffice building. Population in 1910, 7508.

Leaf Insects, popularly known by the name of *walking leaves*. Some of them have wing-covers so closely resembling the leaves of plants that they are easily mistaken for them. The eggs, too, have a curious resemblance to the seeds of plants, and certain wingless species look like slender twigs. Leaf insects are for the most part natives of the East Indies, Australia and South America. The males have long antennae and wings and can fly; the females flight. These insects spend their lives among foliage.



LEAF INSECT

League, leeg, a measure of length which varies in different countries. The English land league is 3 statute miles, and the nautical league is 3 equatorial miles, or 3.457875 statute miles. The French metric league is reckoned as equal to 4 kilometers, or 4374 yards.

Lean'der. See **HERO**.

Leap Year, a year which has 366 days. It is so named because it leaps over a day more than a common year. Thus, in common years, if the first day of March is on Monday in the present year, it will the next year fall on Tuesday; but in leap year it will leap to Wednesday, for every leap year has a day added to the month of February. Every year which is exactly divisible by four is a leap year unless the number representing the year terminates in two ciphers, in which case it must be divisible by 400 in order to be a leap year.

Lease, lees, a permission to occupy lands or tenements for life or for a certain number of years or during the pleasure of the parties making the contract; also, the contract itself. The party letting the lands or tenements is called the *lessor*, the party to whom they are let, the *lessee*, and the compensation or consideration for

the lease, the *rent*. A lease for a period varying in different places from one to three years may be by verbal contract, but for a longer period it must be in writing. A breach of any of the covenants contained in a lease was formerly sufficient to render it void, but now any breach may be compensated by a money payment. The power to lease necessarily depends upon the extent of the lessor's interest in the property to be leased. A proprietor who has only a life estate can of course lease his property only during his life. A lease creates a certain set of legal relations between landlord and tenant, or lessor and lessee, such, for instance, as the duty of the former to defend his tenant's title and the duty of the latter to make necessary repairs and prevent unnecessary waste. The lease, however, may contain certain other agreements, not necessarily implied in the relation of landlord and tenant; and the latter relation may, on the other hand, exist without the basis of a lease. See TENANT.

Leather, *leth'ur*, the dressed skins of animals, prepared by tanning, tawing or other similar processes. Most leather is made from the skins of cattle and horses, but the skins of asses, pigs, goats and sheep are also used. The leather made from the skins of large animals, such as the horse and the ox, takes the name *hide*, combined with the name of the animal, as *cowhide* and *horsehide*, while that from the skins of small animals is named by combining the word *skin* with the name of the animal, as *sheepskin* and *calfskin*.

TANNING. When received by the tanner, hides are in various conditions. Those coming from a distance are usually cured by salting or drying, sometimes by both processes. Before they can be tanned the cured hides need to be brought back as far as possible to the condition of fresh hides. This is done by soaking and softening them in water, to which, sometimes, salt or carbolic acid is added. Softening is generally hastened by the use of machines, which subject the skins to a kneading process. The hair is then removed by the use of lime, the customary method being to spread the hides in a tank containing milk of lime and to expose them frequently to the air. After the hair has been loosened by this process, it is scraped from the hides, either by hand or by machines.

After being thoroughly cleansed to remove all traces of lime or other matter, the skins are placed in the tanning vats, which contain a solution made by soaking ground oak or hem-

lock bark in boiling water. The skins are first placed in a weak solution of the liquor, and as the process continues they are changed from this to one a little stronger, and so on until the process is completed in the liquor of greatest strength. This gradation is necessary to secure a thorough tanning of the hide and to prevent the formation of hard and brittle leather. The tanning of large hides from horses and cattle requires from four to twelve months by this process. Skins from smaller animals can be tanned much more quickly. In some works a chemical process which is much more rapid is now employed, especially for the manufacture of the leather used for the uppers of shoes and other purposes where great strain is not required. Sheepskins and goatskins are prepared by a process called *tawing*. In this process bran and alum take the place of the tan bark and produce a very soft, pliable leather, which is extensively used in making gloves and mittens and the uppers for women's shoes.

KINDS OF LEATHER. Sole leather is made from the thick parts of horsehide and cowhide, found along the back. Uppers are made from the thin portions of these skins or from the skins of smaller animals, such as calf, sheep and goat. From goatskins various grades of *kid* and the so-called *Morocco*, extensively used in book binding and making pocketbooks, are made. An imitation Morocco is also made from sheepskin. *Cordovan* is made from horsehide and is waterproof. *Patent leather* is made by treating the tanned skin with coatings of lampblack and oil, each of which is allowed to dry, and by rubbing down with pumice stone. The finishing coat contains varnish, after the application of which the leather is baked.

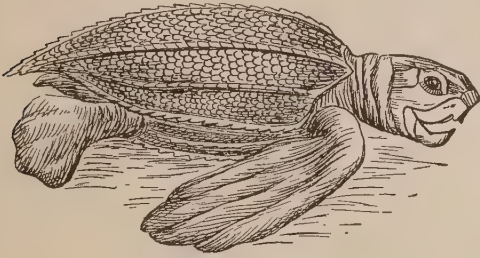
The United States manufactures the best leather in the world and exports it in large quantities. In order to meet the demand for this product, hides are imported from Australia, Argentina and other countries. See TANNING.

Leather, -ARTIFICIAL, the name for certain materials which resemble leather in general appearance and are used for practically the same purposes. The demand for leather exceeded the supply, and it was necessary to produce some article which could take its place. The first article of this kind was made in America in 1849 and was called *leather cloth*. The method is as follows: The cloth is covered with oily pigments, is then dried in a heated oven and after passing between rollers is covered with pumice dust, to make it smooth, after which it is coated several

Leatherback

times with enamel paint. Another kind is made of leather parings and shavings; which, on being reduced to a pulp, are molded into various objects. Still another kind, called *vegetable leather*, consists of caoutchouc, dissolved in naphtha and spread over linen cloth. This kind is especially strong and durable.

Leatherback or **Leatherback Turtle**, a marine turtle found in all tropical seas, but most frequently in the western part of the Atlantic Ocean. It sometimes comes as far north as Long Island, in the United States, and France,



LEATHERBACK

in Europe. This is the largest turtle known, and specimens measuring $6\frac{1}{2}$ feet in length and weighing upwards of a thousand pounds have been found. The brown shell is soft and leathery. The flesh is not suitable for food.

Leatherwood, **Moosewood** or **Wicopy**, a bush common in the United States, with small yellow flowers, flexible jointed branches and a tough, leathery, fibrous bark, which is used by the indians for thongs.

Leavenworth, *lev'en worth*, KAN., the county-seat of Leavenworth co., 18 mi. n. w. of Kansas City, on the Missouri River and on the Atchison, Topeka & Santa Fé, the Chicago, Burlington & Quincy, the Union Pacific and other railroads. The city is in a farming region, is near valuable coal mines and is an important commercial center. The manufactures include brick, stoves, furniture, machinery, flour, wagons and other articles. Among the chief buildings are the Cathedral of the Immaculate Conception, a city orphanage, two hospitals and the Whittier Library. There are several ward schools and a high school. The United States has its largest penitentiary for civilian convicts here. A soldiers' home is south of the city, and on the north is Fort Leavenworth military reservation, at which a military school for post-graduate courses for subaltern officers is maintained. The first newspaper in Kansas, the *Herald*, was published in Leavenworth in 1854. Leavenworth was

Lebanon

settled by Southern sympathizers in 1854 and was chartered the next year. During the slavery agitation it was a strong pro-slavery center. Population in 1910, 19,363.

Leaves, *leevz*, may be said to be the lungs of plants. They are arranged on the branches in a certain definite, regular order, always the same in the same species. Usually as they grow they arrange themselves in this definite order, so as to expose the largest possible surface to light and moisture. The size and shape of leaves seems to be dependent upon the locality which the plant favors. As they are the organs of evaporation, the upper surfaces are glazed, while the pores are on the under surface of the leaf; and in very dry regions or where the sun is hot and clouds rarely intervene, the leaves may be very much reduced in size, glazed on both surfaces, or may disappear entirely from the plant. A typical leaf consists of an expanded blade and a stem, with, in some species, two small bracts at the base. The blade may be a simple and rounded expansion of the stem, with a perfectly smooth outline, or it may be notched or cut and divided, or in any one of the hundreds of intermediate shapes, even to the delicately dissected feather-like leaf of the acacia. The leaf performs four functions in plant economy: First, it makes starch; second, it assimilates the prepared foods; third, it throws off the water which has served its purpose in plant circulation, and fourth, it brings oxygen into contact with living plant cells. See CHLOROPHYLL.

Lebanon, PA., the county-seat of Lebanon co., 26 mi. e. of Harrisburg, on the Philadelphia & Reading and other railroads. The city is in the Lebanon Valley between the Blue and the South Mountains, near the famous Cornwall iron mines. There are also deposits of brownstone, limestone and brick clay in the vicinity. The industries are chiefly mining, quarrying, brick-making and manufacturing of silk, machinery, nuts and bolts, chains and other articles. The city has four public libraries, a business college, a school of telegraphy and a number of churches. The place was settled by Germans about 1700. It was incorporated in 1820 and was chartered as a city in 1885. Population in 1910, 19,240.

Lebanon, MOUNTAINS OF, two nearly parallel ranges in the north of Palestine, extending parallel with the coast of the Mediterranean. The range on the west is called Lebanon, and that on the east, Anti-Lebanon. The former is by far the loftier range of the two and presents an almost continuous ridge, the loftiest summit

of which is over 10,000 feet above the sea. Though under the snow limit, snow and ice remain throughout the year in the higher ravines. The ranges were formerly famous for their cedars, but there are now but a few hundred of the trees left. In the southern part of the chain the Upper Jordan has its source. See PALESTINE.

Lebrun, le brôn', CHARLES (1619-1690), a French painter and architect, born in Paris. He studied first with French artists and later went to Rome. Returning to France in 1642, he was immediately honored with the commission to reconstruct part of the Louvre, which had been destroyed by fire. During the reign of Louis XIV he possessed great influence, having charge of all the artistic enterprises of the king, including the decoration of the palace and park at Versailles. Another important undertaking was the construction and decoration of the Chateau of Marly, which was destroyed, but the designs of which have been preserved. Besides his architectural and decorative work, he painted numerous portraits and historical pictures, many of which hang in the Louvre and other principal European galleries.

Leck'y, WILLIAM EDWARD HARTPOLE (1838-1903), an English historian, born in Ireland and educated at Trinity College, Dublin. His *Leaders of Public Opinion in Ireland* was published anonymously, but with the publication, four years later, of the *History of the Rise and Influence of the Spirit of Rationalism in Europe*, he gained a wide reputation. He became the representative of the University of Dublin in Parliament, where he attained distinction as a speaker and later was called to the Privy Council, but resigned in 1902. His best works besides those mentioned are *History of European Morals from Augustus to Charlemagne*, *History of England in the Eighteenth Century* and *Democracy and Liberty*.

Leclaire, le klair', EDNÉ JEAN (1801-1872), a French merchant and economist, considered the founder of the system of profit sharing. He began as a painter in Paris and soon built up a large business. In 1842 he announced his plan to share the profits of his business with his employes, giving each about \$50. After 1853 a mutual aid society, which he had established much earlier, was supported from the profits of the concern, instead of from contributions of the individual members, as previously. Some years later an old age pension system was created. The establishment which he founded is still prosperous.

Lecompton Constitution, a constitution adopted by a convention held at Lecompton, Kan., in 1857. It contained provisions declaring the legality of slavery in Kansas, prohibiting emancipation and forbidding the amendment of the instrument for seven years. The only portion submitted to the vote of the people was the question of the extension of slavery in the state, the rights of the present slave owners being declared inalienable. In the election the constitution was adopted, the free-state men declining to vote and the slavery vote being swelled by Missouri voters. In an election over the same instrument held under the auspices of the free-state legislature, the constitution was rejected in January, 1858. After a long contest in Congress it was voted that it should be again submitted to the people and the acceptance of the constitution was a prerequisite for admission. It was again rejected, however, and an anti-slavery constitution was adopted in 1859. See KANSAS, subhead *History*.

Le Conte, le kont', JOSEPH (1823-1901), an American geologist, born in Liberty County, Ga., and educated at Franklin College and the College of Physicians and Surgeons in New York City. At Harvard University he studied under Agassiz, whom he accompanied on a scientific expedition to Florida. Later he was made, successively, professor of natural science in Oglethorpe University, professor of natural history in Franklin College, professor of chemistry and geology in the University of South Carolina and professor of geology in the University of California, which position he held until his death. He did much towards popularizing geology throughout the country and wrote many valuable works, among which are *Religion and Science*; *Elements of Geology*; *Compend of Geology*; *Evolution, Its Nature, its Evidence and its Relation to Religious Thought*.

Lee, ARTHUR (1740-1792), an American diplomatist, brother of Richard Henry Lee and Francis Lightfoot Lee, born in Virginia. He completed his education in England and at the University of Edinburgh and, returning to America, began the practice of medicine at Williamsburg, Va. Later he studied law in London and practiced his profession there, but was an earnest opponent of the policy of Great Britain in regard to the colonies, and succeeded Benjamin Franklin as the agent of Massachusetts. Later he was the secret emissary of the Continental Congress in England and France and was the acknowledged United States minister



ROBERT E. LEE

in France and Spain, being one of the commissioners who signed the treaty of alliance in 1778. After returning to America in 1780 he held numerous state and national offices.

Lee, CHARLES (1731–1782), an American Revolutionary general. He was the son of a British officer, took part in Braddock's campaign in 1755 and served during the last French and Indian war. He then returned to England, but removed to America in 1773, and on the outbreak of the war he was appointed major general, by Congress. He took part in the siege of Boston, commenced the fortifications around New York and was given credit for the victory at Charleston in 1776. He was captured in the autumn of that year, but was exchanged in time to take a command in the Battle of Monmouth. His conduct at that time led to his reprimand and finally to his dismissal from the army.

Lee, FITZHUGH (1835–1905), American soldier, nephew of Robert E. Lee, born in Fairfax Co., Va. He graduated at West Point and saw some service in the Federal army, but at the outbreak of the Civil War he joined the Confederate forces and rose to the rank of major general before the close of the war. He was elected governor of Virginia in 1885 and held the office until 1890. In 1896 President Cleveland appointed him consul-general at Havana, and he was asked to remain at that post when President McKinley came into office. He returned to the United States at the outbreak of the war with Spain and was appointed a major general by President McKinley. In 1899 he was made military governor of Havana.

Lee, FRANCIS LIGHTFOOT (1734–1797), an American statesman, one of the signers of the Declaration of Independence. He was born in Virginia, a brother of Richard Henry Lee and Arthur Lee, and was for ten years a member of the Virginia House of Burgesses and later sat in the Continental Congress. After the Revolutionary War he retired to private life.

Lee, HENRY, called *Light Horse Harry* (1756–1818), an American Revolutionary general, born at Leesylvania, Va., and educated at Princeton College. In 1776 he was appointed captain of a company of cavalry in Colonel Bland's Virginia regiment, and in the following year he joined Washington's army just before the Battle of Brandywine. He served through the war as scout, and he had command of the brilliant expedition against the British at Paulus Hook. In the memorable retreat of Greene before Lord Cornwallis, Lee's legion acquired fame as the

rear guard of the American army, the post of greatest danger, and at the battles of Guilford Court House and Eutaw Springs, Lee especially distinguished himself. On the conclusion of the war he was sent to Congress as a delegate from Virginia, and in 1792 he was chosen governor of that state. In 1801 he retired from public life.

Lee, RICHARD HENRY (1732–1794), a distinguished American of the Revolutionary era, born at Stratford, Westmoreland County, Virginia. He was chosen a delegate to the House of Burgesses, and in the opposition to unjust British claims he played a most important part. On being sent as delegate to the first American congress at Philadelphia (1774), he was at once recognized as a leader in that assembly. He drew up many addresses to the king and the English people, which were admitted, even by his political opponents, to be unsurpassed by any of the state papers of the time. On June 7, 1776, he introduced the motion finally breaking political connection with Britain. In consequence of weak health, he was unable to serve in the field, but his activity as a politician was unceasing and extremely valuable, especially in his own state. In 1784 he was unanimously elected president of the Congress. He opposed the ratification of the Federal Constitution, but later entered the Senate as an Anti-Federalist.

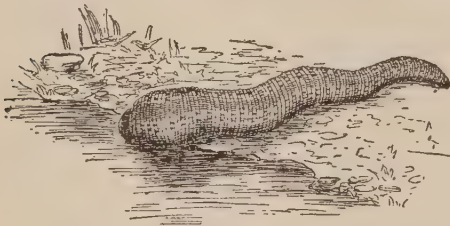
Lee, ROBERT EDWARD (1807–1870), an American general, commander in chief of the Confederate army and one of the most skilful tacticians who took part in the Civil War. He was the son of the Revolutionary cavalry leader, "Light Horse Harry" Lee, and was born in Westmoreland County, Va. In 1829 he left the military academy of West Point with the rank of second lieutenant of engineers. After serving for a time as chief engineer of the army in Washington, and superintending the construction of defenses in New York Harbor, he was appointed in 1847 engineer in chief of the army for the Mexican campaign. His brilliant services at Cerro Gordo, Contreras, Churubusco and Chapultepec gained for him the rank of colonel. From 1852 to 1855 he was superintendent of military studies at West Point, and in 1855 he was made lieutenant colonel of cavalry.

In 1861 he became colonel of his regiment, but on the secession of Virginia from the Union he threw up his commission and, despite the fact that he was strongly opposed to disunion, accepted the command of the Virginian army and subsequently was selected by President Davis

Leech

a commander in chief. In June, 1862, he created the Federal army under McClellan in a series of battles around Richmond, and, aided by "Stonewall" Jackson, he defeated Pope in a number of engagements commencing August 20 and ending with the victory of Manassas Junction on the thirtieth. Lee then crossed the Potomac into Maryland to threaten Washington itself, but a series of checks obliged him to withdraw behind the Rappahannock. The plan of the Federals now was to advance on Richmond, but this was prevented by Lee, who, on December 13, defeated Burnside at Fredericksburg, and on May 2 and 3, 1863, gained the victory of Chancellorsville over Hooker. After this, Lee resolved on an invasion of Pennsylvania, but was beaten by Meade at Gettysburg, July 1, 2 and 3, and forced to retreat into Virginia. The campaign of 1864 was begun by the advance of General Grant on May 4. A succession of stubbornly contested battles followed, from the "Wilderness," by way of Spottsylvania and Cold Harbor, to Petersburg. On April 2, 1865, Grant broke through Lee's defenses, and Lee's attempt to unite with Johnston was prevented. The Union forces with their great superiority of men gradually hemmed in the Confederate army, which on April 9 surrendered to Grant at Appomattox Court House. General Lee retired into private life, but in October of the same year was elected president of Washington College, Lexington, Va., now Washington and Lee University.

Leech, the common name of certain worms, characterized by the presence of one or two



LEECH

sucking disks. The rings or segments of the body are very numerous and closely set. Leeches chiefly inhabit fresh-water ponds, though some live among moist grasses and some are marine. They breathe through the general surface of the body or through little pouches. In Ceylon are land leeches, which live in damp foliage and are often a serious pest to travelers. In those species generally employed for medicinal purposes, the mouth is situated in the middle

Leek

of the anterior sucker and is provided with three small white teeth which are capable of making a peculiar Y-shaped wound, which is difficult to close and permits a large flow of blood. A single leech may draw as much as one ounce of blood. After the leeches are sated and have detached themselves, they may be made to disgorge the blood they have drawn by placing them in a weak solution of salt. Leeches bury themselves in winter in the mud at the bottom of pools and come forth again in the spring.

Leech, JOHN (1817-1864), an English artist and caricaturist, born in London. He was educated at Charterhouse, where he became acquainted with Thackeray, who was his life-long friend. He studied medicine, but was most proficient in his drawings, and he soon began to support himself by this means. He first published an independent volume of sketches and etchings and later became associated with *Punch*, where his works brought him to wide public notice. Later he illustrated the works of some of the greatest English authors, including both Thackeray and Dickens. He was one of the first of English cartoonists to abandon the coarse humor which had previously characterized newspaper drawings.

Lee'chee'. See LITCHI.

Leech Lake, a lake in northern Minnesota, one of the chief feeders of the Mississippi River in its early course. Its length is about 20 miles, its width, 15 miles, and its height above sea level, 1297 feet.

Leeds, *leeds*, a manufacturing town of England, on the River Aire, 21 mi. s. w. of York. Leeds has been for generations the chief site of the woolen manufacture of Yorkshire. The city is situated in a rich coal and iron district, and the iron industry is almost as important as the cloth industry. Among the chief buildings and institutions are Saint Peter's Church, Saint John's Church, the townhall, the royal exchange, a grand theater, Mechanics' Institute, Central Public Free Library and University of Leeds. Near by is the Kirkstall Abbey, a magnificent ruin. Besides cloth manufactures, there are manufactures of boots and shoes, locomotives, agricultural machines, glass, tobacco, oil, worsted, silk and pottery, while nearly a hundred collieries are worked in the district, and some of the largest tanneries in the kingdom are located here. Population in 1911, 445,568.

Leek, an odd little plant which is native in the southern mountain ranges of Europe. The

peasants used to plant leeks on the roofs of their cottages as a protection against lightning. In this particular species the stem grows to a height of eight or ten inches and bears a few purplish flowers, but the most noticeable feature is the thick, fleshy leaves, which grow in pretty clusters close to the ground. Because of the trim and compact form of these plants, gardeners grow them in large quantities and cover the ground in neat patterns which from a distance resemble paintings. Some species are edible.

Lee'ward Islands, a British colony including a number of the West Indies, divided into five administrative districts, namely, Antigua, Saint Christopher, Dominica, Montserrat and the Virgin Islands. The area of the group is 701 square miles. The capital is Saint John, in Antigua. Population in 1911, 127,189.

Leeward Islands, a name frequently applied to that portion of the West Indies which includes Porto Rico and the islands lying immediately to the west of it; also a group of islands in the Caribbean Sea, extending westward from Trinidad. See **WINDWARD ISLANDS**.

Legacy, *leg'a sy*, technically, a gift of personal property or of money by the will of a deceased person. It is thus distinguished from devise, which is a gift of real estate by a will. See **WILL**.

Le Gallienne, *legal'ly en*, RICHARD (1866-), an English journalist and author, born in Liverpool, educated at Liverpool College. He became literary critic for the *Star* in 1891 and was also associated with other papers. He first came into prominence in a religious controversy, which resulted in the publication of the *Religion of a Literary Man*, and he later attained notoriety by his attack on Rudyard Kipling's method and ability. In 1898 he came to the United States on a lecture tour and later settled in New York. Among the best of his works are *Retrospective Reviews*; *Prose Fancies*; *English Poems*; *Travels in England*, and *George Meredith, Some Characteristics*.

Le'gal Ten'der. See **TENDER**.

Legal Tender Cases, a series of cases before the Supreme Court of the United States, concerning the legality of the acts of Congress making United States notes legal tender. The first case, that of *Hepburn versus Griswold*, was brought from the State of Kentucky, where a court had held the act unconstitutional. The Supreme Court reaffirmed this decision in November, 1869, but after changes in the personnel of the court and an addition to its mem-

bership, the decision was reversed in May, 1871. In a later case in 1878 the question was again brought before the court on the ground that, though the act of Congress was legal as a war measure, it was not legal in time of peace. With a single dissenting vote, that of Justice Field, the court decided that the act was constitutional in both war and peace. See **TENDER**.

Legend, *lej'end* or *le'jend*, originally the title of a book containing the lessons that were to be read daily in the service of the early Church. The term was afterward applied to collections of biographies of saints and martyrs, or of remarkable stories relating to them, because they were read at matins and in the refectories of cloisters and were earnestly recommended to the perusal of the laity. Among the best-known collections were the *Legenda Sanctorum*, or *Historia Lombardica* and the *Golden Legend*.

Legendre, *le zhahN'dr'*, ADRIEN MARIE (1752-1833), a French mathematician, born in Paris. He was early a professor of mathematics in the military school at Paris, and in 1783 he was a member of the Academy. He particularly distinguished himself by profound investigations as to the attraction of elliptical spheroids and by his method of calculating the course of the comets.

Leghorn, a seaport of Italy, capital of the Province of Leghorn, on the Mediterranean, 62 mi. w. of Florence. Leghorn is for the most part modern and well built. Among objects of interest are the Cathedral, the Church of the Madonna, a synagogue richly ornamented with marbles, the English chapel and cemetery and the lazarettos, particularly that of San Leopoldo, which is one of the most magnificent works of the kind in Europe. The manufactures are varied. Shipbuilding is carried on, and within recent years several ironclads have been constructed in the dockyards. Leghorn was a mere fishing village when it came into the possession of the Florentines in 1421, and it continued to be a place of little importance till the sixteenth century. It now ranks among the chief ports, after Genoa and Naples. Population as a commune, in 1911, 105,315.

Legion, *lej'un*, in ancient Roman armies, a body of infantry, at different periods consisting of different numbers of men, from 3000 to above 6000, often with a complement of cavalry. Each legion was divided into ten cohorts, each cohort into three maniples, each maniple into two centuries. Every legion had sixty centurions and the same number of *optiones*, or lieutenants, and

standard bearers. The standard of the legion was an eagle.

Legion of Honor, a French order for the recognition of military and civil merit, instituted by Napoleon in 1802 and inaugurated in 1804. The order has been remodeled several times, the last time just after the downfall of the Second Empire. There are now five ranks or classes: ordinary chevaliers, or knights; officers, commanders, grand officers, grand crosses. The profuse granting of the decoration of the order latterly brought the institution into discredit and the number of chevaliers is now restricted to 25,000, the officers to 4,000, the commanders to 1000, the grand officers to 200 and the grand crosses to 70. The emblem is a five-pointed star of white enamel which bears a figure emblematic of the Republic, with the inscription "*Republique Francaise*," and on the reverse, two flags, with the inscription, "*Honneur et Patrie*" (Honor and Country).

Legislature, *le'jis la'ture*, that organ of government which has the power to make, amend and repeal laws, subject, in some cases, to an organic law, or constitution, from which it receives its powers. In the earliest times of ancient Greece and Rome, the legislative power rested with assemblies, varying in numbers from the whole body of citizens to a few chosen representatives. In the Middle Ages all the functions of government, including the legislative body, were usually united in the king, emperor or feudal lord, but during modern times there has been a gradual return to the ancient system, and in most states laws are now made by assemblies.

Legislatures of modern states, though varying widely in size and power, are agreed in essential principles. The legislature of a country usually consists of two houses, or chambers. In most states one of these is composed of representatives of the people, chosen directly by the votes of male citizens having certain qualifications, such as a certain age and, in some instances, conformity to educational and property requirements. This house generally possesses the sole power to initiate financial legislation and sometimes other legislation affecting the general interests of the people. The other house is representative of classes, as in England (the House of Lords), or of territorial divisions, as in the United States (the Senate). The members are sometimes chosen indirectly by the electors who choose representatives of the other house, and occasionally they are chosen directly by these electors. There is a general agreement as to the rights and

privileges of members of a legislative body during their terms of office, such as freedom from arrest, except for treason or other high crimes, and freedom of debate, subject only to the rules of the body. The tenure of legislators varies greatly. In some states, as in most European countries, members of the upper house serve for life or for long periods, or at the pleasure of the government of the division which they represent. The tenure of the members of the lower house of the legislature varies from one to seven or ten years, though usually it is a short period. Members of the legislature are sometimes compensated, as in the United States, but frequently are not, as in Great Britain and Germany.

Among the states of the Union different names are given to the legislative body in the state government, though it is most frequently known merely as the *legislature*. In small units of government, as in the county of the Western states, the legislative body is merged with the executive body in a board of supervisors, but in cities it is usually a separate organ, known, generally, as the *common council*.

Leguminosae, *le gu'min o'see*, or **Pulse Family**, one of the largest and most important families of plants, including about 7000 species, which are dispersed throughout the world. They are trees, shrubs or herbs, differing greatly in habit. The largest division is characterized by a flower, called *papilionaceous*, because of its resemblance to a butterfly; a good example is the sweet pea. The fruit is usually a pod, or legume, and from this the family takes its botanical name. The leaves are usually compound and sometimes are doubly so. Wood, timber, medicine, dyes, foods and a great variety of substances used in domestic life are produced by this great family, and many species are highly ornamental in foliage or in flower. A great many of the plants of this order are described in their proper places; as, for instance, INDIGO; PEANUT; PEA; BEAN; CASSIA; ACACIA; CLOVER.

Lehigh, *le'hi*, **River**, a river of Pennsylvania which rises near Wilkesbarre, flows southeast, then northeast and joins the Delaware at Easton, after a course of about 120 miles. It is navigable for about 84 miles.

Leibnitz, *lipe'nitz*, GOTTFRIED WILHELM, Baron von (1646-1716), a German scholar and philosopher, born at Leipzig. He studied law, mathematics and philosophy at the university of his native town, where he published a philosophical essay when only seventeen years of age.

This was followed by several legal treatises and by a remarkable philosophico-mathematical treatise. After holding political appointments under the elector of Mainz he went to Paris, where he applied himself particularly to mathematics. He also went to England, where he was elected a member of the Royal Society and made the acquaintance of Boyle and Newton. About this time he made his discovery of the differential calculus (See CALCULUS). The duke of Brunswick-Lüneburg then gave him the office of councilor, with a pension, and after a further stay in Paris he returned to Hanover and entered upon the superintendence of the library. Being commissioned to write the history of the House of Brunswick-Lüneburg, Leibnitz went to Vienna and thence to Italy. About this time he proposed a scheme to reunite Protestants and Catholics. Having assisted the elector of Brandenburg (afterward Frederic I of Prussia) to establish the Royal Academy of Sciences at Berlin, he was made president for life. He was also made a privy councilor by the czar Peter the Great, and he proposed the plans upon which the Academy of Saint Petersburg was established. His writings were voluminous and included mathematics, science, philosophy and religious topics. A sketch of his philosophy was given by him in his *Monadologie*.

Leicester, *les'tur*, the county town of Leicestershire, England, on the Soar, 100 mi. n. n. w. of London. It is a place of considerable antiquity and was known to the Romans under the name of Ratae. Its walls and strong castle were demolished in the reign of Henry II. It suffered severely during the wars of Lancaster and York and also during the Civil War of 1642, having in the latter been first taken by storm by the royalists and then retaken by the republicans. Its manufactures consist of boots and shoes, hosiery, laces, thread and iron ware. Population in 1911, 227,242.

Leicester, ROBERT DUDLEY, Earl of (about 1532-1588), an English courtier, a favorite of Queen Elizabeth. In 1550 he was married to Amy Robsart, daughter of a Devonshire gentleman, and is said to have been accessory to her murder in 1560. Elizabeth created him earl of Leicester and privy councilor and lavishly bestowed titles and estates on him. Her fondness for him caused his marriage with her to be regarded for a time as certain. So great was the opposition that Elizabeth was obliged to renounce any intention she may have had of marrying him; but his marriage with the countess of Essex in

1578 deeply offended her. *Kenilworth*, by Sir Walter Scott, gives the story of Amy Robsart.

Leiden, *li'den*. See LEYDEN.

Leidy, *li'dy*, JOSEPH (1823-1891), a celebrated American naturalist. He was born in Philadelphia and received his education at the University of Pennsylvania. In 1846 he was made chairman of the board of curators of the Academy of Natural Sciences and also filled a position as demonstrator of anatomy in the University of Pennsylvania. Later he was made professor of anatomy in the medical school of the same university, and in 1802 he became professor of biology in the faculty of philosophy. He was elected president of the Academy of Natural Sciences at Philadelphia in 1881, and four years later became president of the Wagner Free Institute of Science. He received many honors for his work and made many valuable contributions to the natural sciences. Leidy's works include contributions to the *Transactions*, to the American Philosophical Society and to other publications, *A Flora and Fauna Within Living Animals*, *Cretaceous Reptiles of the United States*, *The Extinct Mammalia Fauna of Dakota and Nebraska* and *Treatise of Human Anatomy*.

Leif, *life*, **Ericson**. See ERIC THE RED.

Leighton, *la'ton*. FREDERICK, Lord (1830-1896), an English painter, born at Scarborough. When twenty-five years of age he sent to the Academy his picture of *Cimabue's Madonna Carried in Triumph through Florence*, which called forth general admiration. For the next four years Leighton lived in Paris, then took up his residence in London. In 1869 he was elected a Royal Academician, and in 1878 he became president of the Academy, was knighted and was named an officer of the Legion of Honor. In addition to his painting, he gained a high place as a sculptor by his *Athlete Strangling a Python* and his *Sluggard*. The special merit of his work lies in the perfection of his drawing and design, as well as in refinement in execution. Among his many works may be mentioned his *Hercules Wrestling with Death*, *The Bath of Psyche*, *The Music Lesson*, *Lachrymae*, *Cymon and Iphigenia*, *Captive Andromache* and *Ball Players*. The large frescoes at South Kensington Museum, representing the *Industrial Arts Applied to War* and the *Arts of Peace*, are also by him.

Leipzig, *lipe'tsiK*, or **Leipsic**, *lipe'sik*, the largest city of the kingdom of Saxony and one of the chief seats of commerce in Germany, is

Leipzig

situated on the Elster, Pleisse and Parthe, 64 mi. w. n. w. of Dresden. The market place in the old town has a picturesque appearance, having about it the old townhall (Rathaus) and other buildings in the Renaissance style. It contains a fine war monument, erected in 1888. The Augustusplatz is one of the finest squares in Germany and contains the university, the museum, the theater and the postoffice. The Pleissenburg, or castle, now used in part as a barrack, withstood the attacks of Tilly and is memorable as the scene of the famous disputation between Luther and Doctor Eck. The suburbs contain the Church of Saint John, the Church of Saint Peter and the Roman Catholic church, the Rosenthal (Valley of Roses), with pleasant wooded walks, and numerous places of recreation. The university, founded in 1409, is the third in importance in Germany and has almost 4000 students and a library of about 500,000 volumes. Schools are numerous and good, and there is a famous conservatory of music. Besides being the center of the book and publishing trade of Germany, Leipzig possesses considerable manufactures and has important general commerce, carried on especially through its three noted fairs at the New Year, Easter and Michaelmas. Leipzig early received the Reformation. In 1631 Gustavus Adolphus defeated Tilly near it, at Breitenfeld. It suffered much from the Seven Years' War. In October, 1813, the great "Battle of the Nations" was fought around and in Leipzig (See LEIPZIG, BATTLES OF). Population in 1910, 589,850.

Leipzig, BATTLES OF. Two important battles were fought near Leipzig during the Thirty Years' War, and one during the war against Napoleon. The first was in September, 1631, and resulted in the defeat of the imperial army, under Tilly, by the Protestants, under Gustavus Adolphus. This was the first great victory which the Protestants had won. The second battle took place in November, 1642, and was also between the Swedes and the imperialists. The imperialists were again defeated.

In October, 1813, a great battle was fought at Leipzig between Napoleon and the Austrians, Prussians, Russians and Swedes. This battle, which was known as the "Battle of the Nations," resulted in a complete defeat for Napoleon.

Leith, leeth, a town of Scotland, situated on the Firth of Forth, 2 mi. n. of Edinburgh, of which it is a seaport. Among the chief buildings are the Trinity house, the customhouse, the

Leland Stanford Junior University

royal exchange and the townhall. Towards the west of Leith is an important fort. The harbor extends more than a mile into the firth and is well built. Among the manufactures are ships, machinery, sailcloth, ropes, ale, soap and flour. The history of Leith is to a large extent connected with that of Edinburgh. Population in 1911, 80,489.

Le'land, CHARLES GODFREY (1824-1903), an American author, born at Philadelphia. He studied law and was admitted to the bar, but after successfully writing for magazines for a time, he gave up the law entirely for a literary life. He is best known through his quaint *Hans Breitmann Ballads*, in Pennsylvania Dutch, and his works on the language and poetry of the gypsies.

Leland Stan'ford Junior University, a coeducational institution of higher learning, located at Palo Alto, Cal., 33 mi. s. of San Francisco. This university was founded by Leland Stanford and his wife in memory of their only child, Leland Stanford, Jr., who died in 1884. The university was opened to students in 1890. The endowment, which at first consisted of about 81,000 acres of land and \$2,500,000, was increased, after Mr. Stanford's death, to about \$30,000,000. The university maintains departments of Greek, Latin, Germanic languages, Romance languages, English, psychology, philosophy, education, economics and social science, law, history, drawing, mathematics, civil, mechanical and electrical engineering, mining, physics, chemistry, botany, physiology and hygiene, zoölogy and geology. The Hopkins Library of Natural History, located at Pacific Grove, is also a branch of the biological department of the University. The usual class divisions are not recognized, and students graduate whenever they have completed the work required for the degree for which they are studying, regardless of the amount of time spent at the university. The buildings are patterned after the old California missions and are arranged around two quadrangles. The material used is gray stone, with red tile for roofing. This combination, together with the arrangement of the buildings, makes Leland Stanford one of the most attractive universities in the country. The beautiful memorial chapel was destroyed and a number of the other buildings were badly damaged by the earthquake which occurred April 18, 1906, but the buildings were replaced at once. The attendance is about 1600, and the library includes over 175,000 volumes.

Lely

Le'ly, PETER, Sir (1617-1680), a German painter, born at Soest, in Westphalia. He was first instructed by Peter Grebber at Haarlem, but went to England in 1641 and commenced portrait painting. He painted portraits of Charles I and of Cromwell, but it was not until the Restoration that he rose to the height of his fame. He was in great favor with Charles II, who knighted him. The finest of his few historical works is the *Susannah and the Elders*, at Burleigh House.

Leman, le mahN', LAKE. See GENEVA, LAKE OF.

Lemberg, lem'berK, a city of Austria-Hungary, capital of Galicia, 365 mi. e. n. e. of Vienna. It is the seat of a Roman Catholic, an Armenian and a Greek Catholic archbishop. It has a university with an attendance of over 2000 and a library of about 180,000 volumes; and the Ossolinski National Institute has a library of over 100,000 volumes, relating chiefly to the history and literature of Poland. Industrially and commercially it is the chief city of Austrian Poland; its industries include the manufacture of iron and steel products, watches, bricks and tiles, malt liquors, and chocolate. Its commerce, mostly in the hands of the Jews, is greatest in flax, hemp, wool and linen. Founded about 1250 by a Ruthenian prince, it was captured by the Poles in 1340, and for four centuries was one of the great cities of Poland. In 1772, at the partition of Poland, it fell to Austria, and in 1914 it was captured by the Russians. Population in 1910, 206,113.

Lem'ming, a burrowing animal, much like the rat. There are several species, found in Norway, Lapland, Siberia and the northern parts of America. The best-known species is the *common*, or *European*, *lemming*, of which the body color is brownish, variegated with black, while the sides of the head and belly are white or of a grayish tint. The legs and tail are gray. The lemming feeds on plants and is exceedingly destructive to vegetables and crops. Vast hordes, at intervals ranging from five to twenty-five years, migrate toward the Atlantic and the Gulf of Bothnia, destroying vegetation in their path. Bears, wolves and foxes make them their prey while they are migrating. One species, called the *banded lemming*, is found in the Hudson Bay region of North America. Like some other fur-bearing animals inhabiting cold countries, it turns white in winter.

Lem'nos, the most northerly island of the Grecian Archipelago, between the Hellespont and

Lemon

Mount Athos. It has an area of about 175 square miles and abounds in vines, wheat, fruits and tobacco. The principal town is Lemnos or Kastro. The volcano, Mosychlus, was at one time active and was regarded as the workshop of Vulcan. Population of the island, about 30,000.

Le Moine, le mwahn', JAMES MACPHERSON, Sir (1825-1912), a Canadian author and naturalist. He was born in Quebec and received his education at Le Petit Séminaire de Quebec. In 1850 he was admitted to the bar. His first public position was collector of inland revenue at Quebec, and later he became inspector. Much of his time was spent in the study of natural history, especially the study of birds, and he made many careful researches and investigations. He was the author of many books, among which are *The Ornithology of Canada*, *Legendary Lore of the Lower Saint Lawrence*, *Maple Leaves and Quebec, Past and Present*.

Lem'on, the fruit of the lemon tree, closely resembling in its structure the orange. The lemon is a native of India, but it is now extensively cultivated in the south of Europe and in Florida and California. The lemon tree is a knotty-wooded tree of rather irregular growth, about eight feet high. The leaves are oval and contain an oil which is of some value in making extracts and for other purposes. The fruit is oblong, and the juice is very sour, though when the fruit is ripe it is agreeable. It ripens in winter, but since the lemon is in greatest demand during the summer, the ripened fruit is preserved under cold storage. The fruit does not ripen well on the tree; hence it is picked green and allowed to mature slowly in a darkened room. Lemons are used for flavoring beverages and numerous articles of food; also in calico printing and in the manufacture of citric acid. Lemon extract, common in cookery, is made by expressing an oil from the peel or extracting the oil by soaking the peel in alcohol, making a strong solution.

Lemon, MARK (1809-1870), an English humorous and dramatic writer. He made his first literary essays in the lighter drama, supplying the London stage with more than sixty farces, melodramas and comedies. With Henry Mayhew he established *Punch* in 1841, and two years later he became sole editor. He was also literary editor of the *Illustrated London News* and an occasional writer for Dickens's *Household Words* and other periodicals. Among his later productions are some novels of average merit.

Le'mur, the name generally applied to a family of animals between the monkeys and the apes. There are about fifty species, all of which live in Africa or Madagascar and neighboring islands. The fur is soft and delicate and usually of a light color, and the tail is long. Lemurs vary from the size of a cat to that of a mouse.



LEMUR

The *ring-tailed lemur*, a species which lives on cliffs and along the sea, is gray in color, with black and white rings about its tail. The *ruffed lemur* is the largest of the lemurs; the *mouse lemur* is about the size of a rat; the *avahis* is about a foot long, with a tail 15 inches in length; it lives a solitary life and appears only at night. The *indris* is of a black color, with white upon the rump and limbs. The natives of Madagascar call this lemur the *dog of the forest*, because its howls resemble those of a dog, and also from the fact that in some parts of the island it is camed and used to chase birds.

Lemurs are harmless little creatures and are easily tamed, but the peculiar appearance of the face, their large eyes and their habit of feeding at night made them objects of superstition and awe, and gave them the name lemur, which means ghost. See AYE-AYE; LORIS.

Le'na, a river of Siberia. It rises west of Lake Baikal, flows northeasterly, then north-

westerly and enters the Arctic Ocean through several mouths. Its total length is 2700 miles. Its chief tributaries are the Aldan, the Olekma, the Vilim and the Vilyui. Eight hundred miles from the ocean the Lena attains a width of five or six miles, and it is generally navigable during the open season. It is free from ice between Yakutsk and Kirensk from the middle of May to the middle of November, and during this season it is navigable for steamers between these points. The Lena is one of the largest rivers of Asia and the largest within the boundaries of Siberia. It drains an area of about a million square miles.

Lenni-Lenape, *len'ne le nah'pay*. See DELAWARE (indians).

Le Nôtre, *le no'tr'*, ANDRÉ (1613-1700), a French landscape artist, born in Paris. His first important work was the arrangement of the grounds of the Chateau de Vaux. This brought him instant recognition from Louis XIV and other prominent persons, and he was continuously employed in laying out some of the finest grounds in France. He also planned the gardens of the Vatican and the Quirinal, in Rome, and the Saint James and Kensington gardens, in London.

Len'ox, JAMES (1800-1880), an American philanthropist, born in New York City. He was educated at Columbia College and was admitted to the bar. Having inherited from his father several millions of dollars, for half a century he devoted himself to the forming of a library and gallery of paintings. This he conveyed to New York City in 1870, having erected a beautiful structure to receive it. He was a liberal donor to many churches and societies.

Lens, *lenz*, a transparent body having at least one curved surface. Lenses have either one

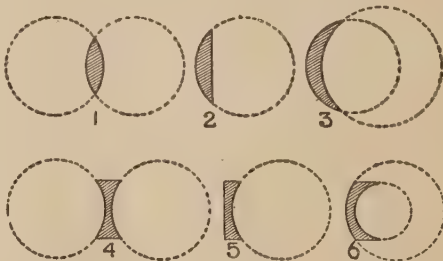


FIG. 1

plane and one spherical surface, or two spherical surfaces. If the surface curves outward, the lens is *convex*; if inward, it is *concave*. There are six kinds, as shown in Fig. 1.

1. Double-convex lens; both surfaces convex.

1. Plano-convex lens; one surface convex and one plane.

2. Concavo-convex lens; one surface convex and one concave.

3. Double concave lens; both surfaces concave.

4. Plano-concave lens; one surface plane and one concave.

5. Convexo-concave lens; one surface concave and one convex.

Lenses refract rays of light which pass through them. If the lens is convex, the refraction tends to bring the rays to a point, called the *focus*, as shown in Fig. 2. The parallel rays 1, 2, 3, 4 and 5, passing through the double-convex lens *LM*, come to a

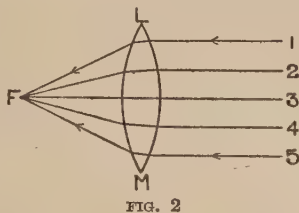


FIG. 2

point at *F*, which is the focus. When the rays of the sun are collected in this way by a double-convex lens, they afford sufficient heat to set such substances as tinder, paper and dry pine wood afire. For this reason, such a lens is sometimes called a *burning glass*.

Convex lenses form two kinds of images. When the object is at a long distance from the lens, the image formed is smaller than the object, and inverted, as shown in Fig. 3. *AB* repre-

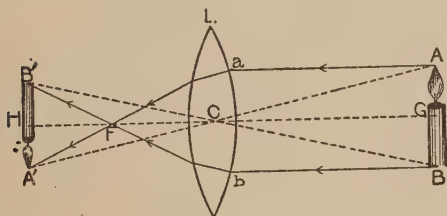


FIG. 3

sents the object. The parallel rays from *A* and *B* strike the lens respectively at *a* and *b*. *Aa* is refracted to *A'* and *Bb* to *B'*. The rays *AA'* and *BB'* strike the lens vertically and pass through its center; consequently they are not refracted. A screen placed at the point where these rays meet the refracted parallel rays will receive the image. If the screen is moved either backward or forward from this point, some of the rays are lost and the image becomes indistinct.

When the object is between the focus and the lens, the image is erect and magnified. In Fig. 4, *AB* is the object and *A'B'*, the image.

The parallel rays from *A* and *B* are refracted and meet at *F*, while the rays *A'A* and *B'B* pass through the center of the lens and are not refracted. The image appears where these rays meet the refracted parallel rays. In this case both the object and the image are on the same side of the lens, while in the former the image is on the other side of the lens from the object. Fig. 4 illustrates the use of the convex lens as a simple magnifying glass. The images formed by concave lenses are erect and smaller than the object. See CAMERA; EYE; MICROSCOPE; OPERA GLASS; TELESCOPE.

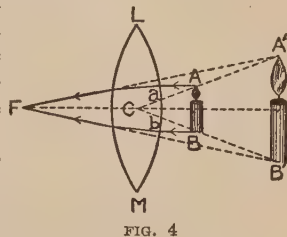


FIG. 4

Lent, the forty days' fast in spring, beginning with Ash Wednesday and ending with Easter Sunday. In the Latin Church Lent formerly lasted thirty-six days, but in the fifth century four days were added, in imitation of the forty days' fast of the Saviour, and this usage became general in the Western Church. The Carnival is held just before Lent begins, and the close is celebrated in Roman Catholic countries with great rejoicings. The English Church has retained Lent and many other fasts, but gives no directions respecting abstinence from food. The forty days of Lent do not include Sundays.

Len'til, the fruit of a plant that resembles the pea vine. Two varieties are recognized; one is distinguished by its size and the greater quantity of mealy substance which the fruits afford. Lentils are flattish, rounded and, when cooked, reddish in color. They are more easily digested than peas, are very nutritious and form the chief article of diet in Egypt, Syria and other Mediterranean countries. They are not uncommon in the markets of the United States.

Le'o (the lion), a bright and interesting constellation, containing ninety-five stars, noteworthy because of its remarkable nebulae. Leo is the fifth sign of the zodiac, between Cancer and Virgo, and is entered by the sun about July 22. In ancient astrology the symbol ($\mathcal{Q}$) was the breastbone or the tail of a lion.

Leo, the name of thirteen popes, of whom the following are most important: LEO I, Saint, pope from 440 to 461, was a very able ruler and strengthened the power of the papacy. When Attila took Rome in 452, Leo visited the conqueror in person and induced him to spare

Leo

the city, and three years later, when Genseric attacked the city, by his interposition he saved many of the most beautiful buildings of the city. LEO III, who became pope in 795, was the pope who crowned Charlemagne emperor of the West. LEO IX, pope from 1048 to 1054, was a learned man and devoted much attention to the correction of abuses within the Church. He firmly upheld the power and rights of the Church and thus prepared the way for the later struggle over prerogatives between the popes and the emperors. LEO X, Giovanni de' Medici, was the son of Lorenzo the Magnificent and became pope in 1513. His court was splendid and, like the other members of his family, he was a munificent patron of learning and art. The University of Rome was reorganized by him. It was during his reign that the Reformation broke out in Germany. At first Leo refused to take the new movement seriously, but in 1520 he went so far as to proclaim a bill of excommunication against Luther. See LEO XIII.

Leo XIII (1810-1903), Giovacchino Vincenzo Pecci, pope of the Roman Catholic Church, born



LEO XIII

at Carpianto, Italy. He became titular archbishop in 1843, was apostolic delegate, successively, of Benevento, Spoleto and Perugia, and was bishop of Perugia in 1846. He was raised to the rank of cardinal in 1853 and appointed chamberlain of the Sacred College in 1877; the Conclave of Cardinals elected him successor to

Leonidas

Pius IX in 1878. The new pope at once made known his election to the powers, and his first official act, March, 1878, was to restore the Roman Catholic hierarchy of Scotland, thus inaugurating a policy somewhat different from that of his predecessor. In 1879 the pope issued an encyclical aimed at Socialists, Communists and Nihilists. The czar ordered this to be read in all the Roman Catholic churches of Russia. The policy of Leo XIII was to harmonize the diversified opinions and interests of the Church and to strengthen all lines of work which it is authorized to undertake. He was very friendly to the United States; he established the Catholic University at Washington, and expressed great interest in the Columbian Exposition. Leo was noted for his learning, holiness and statesman-like qualities.

Leominster, *lem'in stur*, MASS., a town in Worcester co., 5 mi. s. e. of Fitchburg, on the Nashua River and on the New York, New Haven & Hartford railroad. The principal manufactures are piano cases, baby carriages, notions, toys, furniture, paper, cement and brick. The place was settled in 1725 and remained a part of Lancaster until 1740. Population in 1910, 17,580.

Leon, *la own'*, a town of Nicaragua, on a large and fertile plain 13 mi. from the Pacific coast. It is regularly built, and the public buildings, which are considered among the finest in Central America, include a massive cathedral, an old episcopal palace, a new episcopal palace and several churches. A railway connects it with the coast at Corinto. The town has suffered much from the civil wars. Population in 1908, 62,569.

Leon or Leon de los Aldamas, *la one'day-lose al dah'mas*, a town of Mexico, in the State of Guanajuato, on a fertile plain, more than 6000 feet above sea level. It is a well-built place, with flourishing industries of various kinds, which its railway connections have helped to develop. Its chief manufactures are leather, saddlery, cottons and woolens. Population in 1910, 57,334.

Leonardo da Vinci, *la o nahr' do da veen'che*. See VINCI, LEONARDO DA.

Leon'idas, a king of Sparta, who ascended the throne in 491 B. C. When Xerxes invaded Greece, the Greek congress assigned to Leonidas the command of the force destined to defend the pass of Thermopylae. His force, according to Herodotus, amounted to over six thousand men, of whom three hundred were Spartans.

Leopard

After the Persians had made several vain attempts to force the pass, a Greek named Ephialtes betrayed to them a mountain path, by which Leonidas was assailed from the rear, and he and his followers fell fighting (480 B. C.).

Leopard, *lep'urd*, one of the largest animals of the cat family, next in size to the lion and the tiger. It is found in Africa, Persia, India, some parts of China and some of the East India Islands. The color varies from a pale fawn to a deep buff, which fades into white on the under side of the body and the inner parts of the limbs. The coat is thickly marked with black or deep brown spots. The leopard is a beautiful and graceful animal. It frequents the forests and feeds upon antelopes, monkeys, sheep, goats and other animals, but seldom attacks man. It is considered more treacherous than the lion or the tiger, and while it is easily subdued when in captivity, great risk and danger attend hunting it. One variety is nearly black and is more fierce than the common leopard. The *cheta*h, or *hunting leopard*, is found in northern India.

Le'opold I (1790-1865), king of the Belgians, son of the duke of Saxe-Coburg. In 1816 he married the Princess Charlotte, heir apparent of Great Britain, who died in the following year. In 1831 he accepted the crown of Belgium, which was offered him by a national congress. He gave to Belgium a wise and moderate rule. His second wife was a daughter of Louis Philippe.

Leopold II, LOUIS PHILIPPE MARIE VICTOR (1835-1909), king of the Belgians, eldest son of Leopold I, came to the throne in 1865. The organization of the African International Association was his work, and he assisted Stanley with money in his exploration of the Kongo. When the Kongo Free State was established in 1885, Leopold was made its sovereign.

Lepanto, *le pahn'to*, or **Naupaktos**, a seaport town of Greece, in the nomarchy of Acarnania and Aetolia, on the Gulf of Corinth, or Lepanto. Its harbor is now silted up, but it was anciently of considerable importance. It is

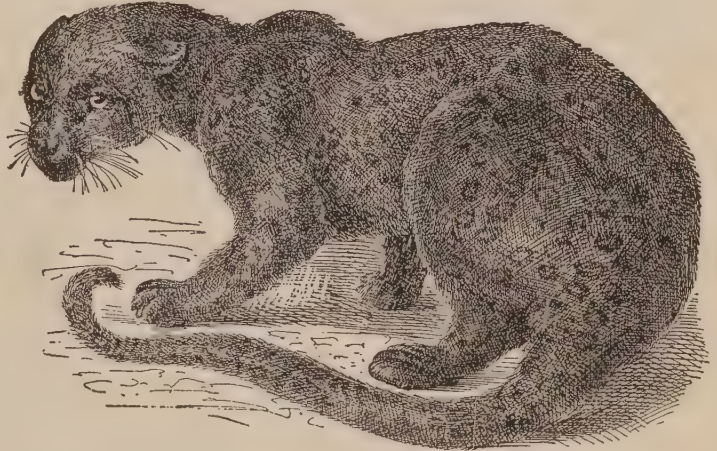
Leprosy

memorable for the naval battle, from which dated the decline of the Turkish power in Europe, fought within the gulf on October 7, 1571, between the Ottoman fleet and the combined fleets of the Christian states of the Mediterranean, under Don John of Austria. The Turkish fleet was destroyed.

Lepanto, GULF OF. See CORINTH, GULF OF.

Lep'er. See LEPROSY.

Lepid'olite, a kind of mica, occurring in



LEOPARD

oblique, rhombic or hexagonal prisms, or in masses composed of small crystalline scales. Its color is pink or peach-blossom, passing into gray and having a pearly luster. It is easily split into thin, translucent, flexible scales, or plates. The mineral is one of the principal sources of the metal lithium.

Lep'idop'tera. See INSECTS.

Lep'idus, MARCUS AEMILIUS (?-13 B. C.), a Roman triumvir. He was praetor in 49 B. C., consul with Julius Caesar three years later and in 44 was appointed by Caesar to the government of Nearer Spain. He was in Rome at the time of Caesar's death and joined Mark Antony. In 43 he united with Antony and Octavianus to form the second triumvirate, obtaining Spain in the division of the Empire. After the Battle of Philippi (42) a revision took place, in which Lepidus received Africa. In 36 he was summoned to assist Augustus against Sextus Pompey. He then tried to seize Sicily, but was overcome by Augustus, who deprived him of his triumvirate and banished him.

Lep'rosy, a name applied at different times to several different skin diseases, all of which are

characterized by roughness and scaliness. True leprosy is the *elephantiasis* of the Greeks, the *lepra* of the Arabs, and the *great disease* of the early English. There are several well-marked types of the disease. In the first, tubercles form in the skin, particularly around the eyebrows, where they destroy the hair and after a time form ulcers, which may cause extensive deformity. Sometimes the tubercles form in the nostrils or throat and alter the voice. In the second type, the chief features are insensibility and numbness of the skin, with pains, sleeplessness and restlessness. A third variety is much more violent and often causes a complete destruction of the tissues, even of the bones. All these varieties begin with the appearance of dull or copper-tinted blotches on the skin. When the redness disappears, a stain or white blotch is left. It is now believed that the disease is caused by a bacillus and is contagious, though it is not nearly so widespread in its prevalence as at former times. It is found in Norway and Iceland and in warmer regions generally. From a very early time lepers were separated from the people or often driven into desert and waste regions, where they lived entirely away from other human beings. Even more severe measures were taken against them in some countries, where they might be allowed to come among the healthy, but were compelled to be so clothed as to be recognized at sight and were forced to carry rattles with which to warn others of their approach.

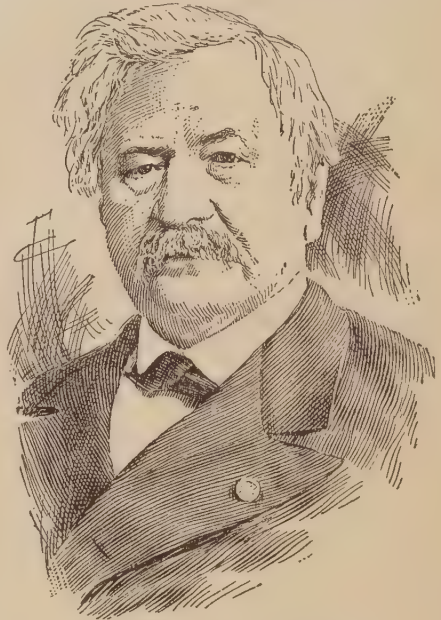
In the United States, Louisiana has a hospital for lepers, in which there are probably less than a hundred now congregated. There are many lepers in the Hawaiian Islands. The care of them has become a burden upon the government. Most of them are confined in a leper settlement on Molokai, where they number about 1300. Here they are allowed to receive visitors, who may, however, not touch them, and from whom they are separated by wire fencing.

Lesage, *le sahzh'*, ALAIN RENÉ (1668-1747), a French novelist and dramatic writer. His first attempts were in imitation of the Spanish drama, but his first success was with his *Crispin, his Master's Rival*. *The Devil on Two Sticks*, imitated from a Spanish romance, appeared the same year. In 1715 he published the first two volumes of *Gil Blas*, one of the best romances in the French language, the third volume appearing in 1724, the fourth in 1735. Among his other works are *Turcaret*, his best comedy; *The Adventures of Guzman d'Alfarache*, *The Adven-*

tures of M. de Beauchesne and *The Bachelor of Salamanca*.

Lesbos, *lez'bos*, a Greek island situated off the northwest coast of Asia Minor, often called Mytilene, from its capital. In shape it is nearly triangular, and it has an area of 675 square miles. It is mountainous, but is exceedingly fertile, its principal products being figs, grapes, olive oil and pine timber. The island has belonged to Turkey since the sixteenth century.

Les'seps, FERDINAND, Vicomte de (1805-1894), a French diplomatist and engineer. After



FERDINAND DE LESSEPS

holding several consular and diplomatic posts he retired from the government service, and in 1854 went to Egypt and proposed to the viceroy the cutting of a canal across the Isthmus of Suez. This great work was successfully completed in 1869, under his supervision, and brought him high honors of various kinds. He subsequently proposed several other grand schemes; but the only one really taken in hand was the Panama Canal, which, under French management, proved an unfortunate venture. See PANAMA CANAL.

Lesser Antilles, *an til'leez*. See ANTILLES.

Les'sing, GOTTHOLD EPHRAIM (1729-1781), a German critic, dramatist and scholar. He entered the University of Leipzig in 1746 to study theology, but his love of the drama and his intimacy with Schlegel and other young men

of literary tastes, led him to abandon this intention. In 1755 appeared *Miss Sara Sampson*, a tragedy dealing with the family relation, which had a great effect on German drama. In 1760 Lessing became secretary to General Tauenzien in Breslau for five years, and while there he worked on *Minna von Barnhelm*, the greatest drama produced up to that time in Germany, and *Laokoon, or on the Limits of Painting and Poetry*. About 1767 he became director of the National Theater at Hamburg. While here he wrote his *Dramaturgie*, essays on dramatic art. In 1775 he accompanied Prince Leopold of Brunswick to Italy, and on his return he married. His wife died in little more than a year. At this period he was involved in fierce theological disputes, which his philosophical drama, *Nathan der Weise*, did nothing to allay.

Le'the (from a Greek word meaning *forgetfulness*), one of the streams of the lower regions, celebrated in ancient mythology. Its water had the power of making those who drank of it forget the whole of their former existence. Souls before passing into Elysium drank to forget their earthly sorrows; souls returning to the upper world drank to forget the pleasures of Elysium.

Letters. From very early times the writing of letters has been an important means of communication, and often it has served a much wider purpose than this, as in many instances correspondence which has been preserved has furnished to later ages valuable information regarding the times of the writer. In early times in Greece, correspondence as far as is known was largely between the philosophers and their pupils. Among the Romans, letter writing was more widespread, and certain collections of letters, especially those of Cicero to Atticus, constitute documents of great historical importance. Seneca's letters and those of the Younger Pliny are other notable collections. It was the Romans who first developed the poetical epistle, which was usually a satirical account of private or public affairs. Horace was especially adept in this style of writing. In later centuries Dante, Petrarch, Melancthon and Erasmus wrote letters which have been preserved and which are valuable records of the times.

With increased facility for communication came, of course, corresponding increase in the number of letters which passed between friends. Letters came to be no longer dissertations on public affairs only, but accounts of the real lives of real men and women. Swift's letters to Stella,

as well as those of Arbuthnot, Bolingbroke and Pope, present an almost complete autobiography of the writer. Lady Mary Wortley Montagu's letters are among the most famous which have ever been written by a woman. Chesterfield's letters to his son and Walpole's, Gray's and Cowper's letters are examples of different styles of letter writing, but all show the perfection to which this art may be brought. In the nineteenth century George Eliot, Byron, Lamb, Keats, Scott, Macaulay, Emerson, Carlyle, Mrs. Carlyle, Thackeray, Dickens, Matthew Arnold, Stevenson—in fact, almost all of the famous men and women of literature—left collections of letters which throw most interesting light on their lives and works.

The French have always excelled in letter writing, and perhaps the most famous letter writer of modern times is Madame de Sévigné, whose letters to her married daughter present an excellent picture of Parisian life.

Lettres de Cachet, *let r' de kash shay'*, (French, "letters of seal"). During the four centuries before the outbreak of the French Revolution, it was common for the king or any of his ministers, if they wished to get rid of some person without going through the ordinary forms of law, to order the arrest of such a person and to dispense with the countersigning of the order by a minister, with the registering of the letter by the parlement and with the signature of the great seal of state. Such orders, written on ordinary paper, signed by the king and by one of the secretaries of state and sealed with the king's little seal, were known as *lettres de cachet*. From the accession of Louis XIV the issue of such orders increased in frequency, and often a man might be arrested, thrown into the Bastille and left there, either wilfully or carelessly, until he died, without even being informed as to the nature of his offense. The abolition of these *lettres de cachet* was one of the first things demanded at the outbreak of the revolution in 1789.

Letts, a branch of the Aryan family, belonging to the Letto-Lithuanian group. These people live in the Russian provinces of Courland, Livonia, Vitebsk, Kovno, Pskov and in East Prussia. They are closely related to the Lithuanians, whom they resemble in appearance. They number about 1,350,000 and are mostly Protestants.

Lettuce, *let'tis*, a common little garden plant, of the Compositae, much used as a salad. When allowed to fruit, it produces a stem which grows

to a height of about two feet and bears small, pale yellow flowers. In cultivation the young plant only is eaten, as it becomes bitter and even somewhat poisonous when old. Several different species are recognized, and from one garden variety is produced a form that grows in a head much like a small cabbage. From the sap of one species a drug is obtained that resembles opium in its effects.

Leuctra, *luke'trah*, a village in Boeotia, famous for the victory of the Theban Epaminondas over the Spartans, which put an end to the Spartan domination in Greece (371 B. C.). See EPAMINONDAS.

Leutze, *loit'se*, EMANUEL (1816-1868), a German-American painter, born in Gemünd, Württemberg. At an early age he came with his parents to Philadelphia, where his first instruction in art was received. Later he went to Düsseldorf to study with Lessing. The finest of his productions is a series of pictures of the Revolution, among which is *Washington Crossing the Delaware*. His subjects, more than the quality of his drawings, have made him famous. Other works are *Columbus in Chains*, *Columbus Before the Queen*, *Cromwell and His Daughter*, *Washington at Monmouth*, *News from Lexington* and *Westward Ho*.

Levant', a term applied in the widest sense to all the regions eastward from Italy as far as the Euphrates and the Nile, and in a more restricted sense to the Asiatic coasts of the Mediterranean and the adjacent countries of Asia Minor

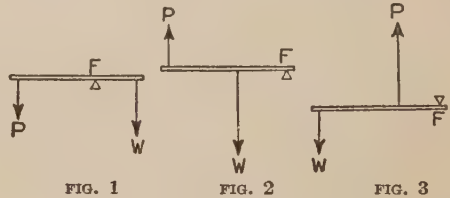
Lev'ee, in engineering, an artificial embankment constructed on the banks of a river for the purpose of keeping the waters in the natural channel during floods. According to this definition the dikes of Holland and the embankments along a number of European rivers, such as the Danube, Po and Vistula, are levees. In the United States, however, the term is applied particularly to the artificial embankments along the Mississippi River, which aggregate more than 1200 miles in length and are constructed along the river at various places from Cairo to the Gulf of Mexico. See MISSISSIPPI RIVER.

Lev'el, an instrument used to find, or draw, a straight line parallel to the plane of the horizon, by this means to determine the true level or the difference of ascent or descent between several places. There is a great variety of instruments for this purpose, differently constructed and of different materials, according to the particular purposes to which they are applied,

as carpenter's level, mason's level, gunner's level, balance level, water level, mercurial level, spirit level and surveying level. All such instruments, however, may be reduced to three classes: (1) Those in which the vertical line is determined by a suspended plumb line, or balance weight, and the horizontal indicated by a line perpendicular to it. Such are the carpenter's and mason's levels. (2) Those which determine a horizontal line by the surface of a fluid at rest, as water and mercurial levels. (3) Those which point out the direction of a horizontal line by a bubble of air floating in a fluid contained in a glass tube. When the air bubble rests directly under the middle point of the tube, the instrument is level. Such are spirit levels, which are by far the most convenient and accurate. All levels depend on the same principle, namely, the action of gravity.

Lever, *le'vur* or *lev'ur*, a bar moving about a point called the *fulcrum* (*F*). The force used to move the lever is called the *power* (*P*), and the object to be lifted, the *weight* (*W*). The parts of the lever on each side of the fulcrum are called the *arms*. The power arm is the part between the fulcrum and the point where the power is applied; the weight arm is that part between the fulcrum and the weight. There are three classes of levers, distinguished by the different applications of the fulcrum, power and weight.

The lever of the first class has the fulcrum between the power and the weight, as shown in Fig. 1. *F* represents the fulcrum, *P* the



power and *W* the weight. A common crowbar, a pump handle and a pair of scissors are good illustrations of levers of the first class.

The lever of the second class has the weight between the power and the fulcrum, as shown in Fig. 2. An oar, a nutcracker and a wheelbarrow are good illustrations of this class of levers.

The lever of the third class has the power between the weight and the fulcrum, as shown in Fig. 3. Good illustrations of the third class lever are the treadle of a sewing machine and the forearm.

A lever is said to be in *equilibrium* when the power and the weight balance each other. The law of equilibrium is that the power multiplied by the length of the power arm is equal to the weight multiplied by the length of the weight arm. In a lever of the first class which is three feet long and has a fulcrum one foot from one end, a power of one pound would balance a weight of two pounds. In levers of the third class the positions of the power and weight are reversed. By levers of the first and second classes we gain power and lose speed; by those of the third class we lose power and gain speed.

Compound levers consist of a number of levers so arranged that the power arm of one acts upon the weight arm of the other. Their effect is to increase the power of the lever. They are illustrated by the hay scale, in which the weight of the hand may balance a load of hay. See **WEIGHING SCALE**.

Lever, CHARLES JAMES (1806-1872), an Irish novelist. He was born in Dublin and educated at Trinity College. In March, 1834, he contributed his first paper to the newly started *Dublin University Magazine*, and the first chapter of *Harry Lorrequer* appeared in that magazine in 1837. Among his later novels are *Charles O'Malley*, *Tom Burke of Ours*, *Jack Hinton*, *Arthur O'Leary* and *Roland Cashel*. The lively humor which is considered characteristic of Lever is more in evidence in his early than in his later writings. For the last thirty years of his life Lever was in the diplomatic service.

Levi'athan (a long-jointed monster), the name applied in *Job* xli and elsewhere in the Scriptures to an aquatic animal variously held to be the crocodile, the whale or some species of serpent.

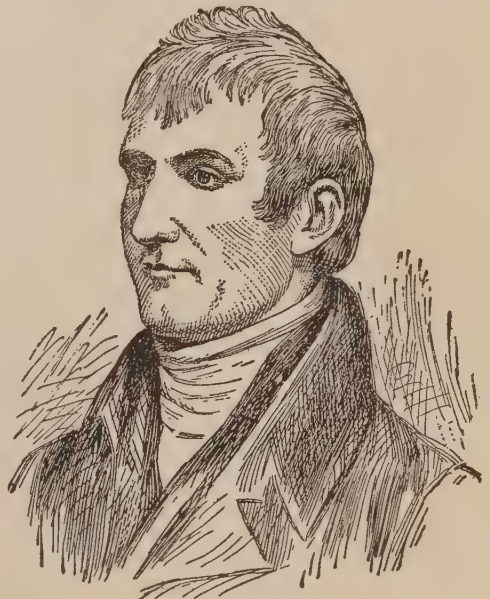
Levis, *le vee'*, or **Point Levi**, capital of Levis co., Quebec, Canada, on the Saint Lawrence River, opposite Quebec. It is on the Intercolonial, the Quebec Central and the Grand Trunk railways and is connected with Quebec by ferry and by a cantilever bridge, the largest of its kind in the world. Steamships arriving from Europe land their passengers at Levis. It has machine shops, an iron foundry, boot and shoe, cigar, soap, woolen and other factories and lumber mills. The first settlement was made in 1647, and it became a city in 1861. Population in 1911, 7448. See **QUEBEC**.

Le'vites, the name generally employed to designate not the whole Jewish tribe that traced its descent from Levi, but a division within the tribe itself, in contradistinction to the priests,

who are otherwise called the "sons of Aaron." They were the ministers of worship, especially singled out for the service of the Temple, and with the priests formed the priestly tribe. A permanent arrangement was made for their maintenance. In place of territorial possessions they were to receive tithes of the produce of the land, and in their turn to offer a tithe to the priests. After the settlement in Canaan, forty-eight cities, six of which were cities of refuge, were assigned to the tribe of Levi, thirteen of the total number being set apart for the priests. To the Levites was to belong the office of preserving, transcribing and interpreting the law, and they were to read it every seventh year at the Feast of Tabernacles. Their position was much changed by the revolt of the ten tribes.

Levit'icus, the name of the third book of the Old Testament, so called from the first word of its contents. By the later Jews it was called the *Law of the Priests* and sometimes the *Law of Offerings*. It consists of seven principal sections, but may be generally described as containing the laws relating to Levites, priests and sacrifices.

Lewis, MERIWETHER (1774-1809), an American explorer, born near Charlottesville, Va. He fought in the United States army during the Whisky Rebellion in 1794 and later became an



MERIWETHER LEWIS

ensign and captain in the army. In 1801, President Jefferson appointed him his private

Lewis and Clark Expedition

secretary, and two years later he was chosen to lead an expedition for the purpose of exploring the territory recently acquired from France (See LEWIS AND CLARK EXPEDITION). As a reward for his service in this expedition, Congress voted him 1500 acres of land, and he was appointed governor of Louisiana Territory in 1807. He displayed energy and ability in administration and during his incumbency prepared a valuable account of his journey. It is supposed that he committed suicide.

Lewis and Clark Expedition, an expedition commanded by Meriwether Lewis and William Clark, whose purpose was to explore the territory between the Mississippi River and the Pacific Ocean. The party left Saint Louis, Mo., May 14, 1804, ascended the Missouri River, wintered among the Mandan Indians in North Dakota, again set out in April, 1805, crossed the Rocky Mountains in September and came in sight of the Pacific Ocean, November 7. They started on their return in the following March and arrived at Saint Louis, September 23, after a journey of 8500 miles. The trip resulted in the collection of a great mass of exceedingly valuable information concerning the geography, climate, natural products and animal life of the region explored. See CLARK, WILLIAM.

Lewis and Clark Exposition, an industrial exposition held at Portland, Ore., in the summer of 1905, to commemorate the one hundredth anniversary of the journey of Meriwether Lewis and William Clark from the Mississippi River to the Pacific coast. The exposition buildings, of which there were eleven main structures, were artistically grouped on a beautiful sloping greensward, facing two attractive bodies of water, which made possible the development of landscape and architectural scenes of rare beauty. The exhibition covered about 406 acres. Its total cost to its promoters was about \$7,500,000; to the states that had special exhibits, \$1,000,000, and to the Federal government, \$500,000.

Lewis River. See SNAKE RIVER.

Lewiston, IDAHO, the county-seat of Nez Perces co., about 145 mi. s. by e. of Spokane, Wash., at the junction of the Clearwater and Snake rivers and on the Northern Pacific railroad. The city is in a rich farming, fruit-growing, stock-raising and mining district, has a considerable trade and is growing very rapidly. The most important industrial establishments are flour and lumber mills. The city is the seat of the state normal school and of several private

Lexington

academies. A splendid steel bridge connects the place with Clarkston, on the opposite side of the Snake River. Population in 1900, 2424, and in 1910, 6043.

Lewiston, MAINE, a city in Androscoggin co., 35 mi. n. of Portland, on the Androscoggin River, opposite Auburn, and on the Grand Trunk and the Maine Central railroads. It has many factories, of which the most important are cotton and woolen mills. There are also extensive bleaching and dye works and manufactures of boots and shoes, lumber, machinery and various products. Bates College, which includes the Cobb Divinity School, is located here, and the city has a fine public park, a city hall, a Carnegie library, two hospitals, two convents and a number of fine church and school buildings. The place was settled in the early part of the seventeenth century and was incorporated as a town in 1795. It was chartered as a city in 1863. Population in 1910, 26,247.

Lexington, KY., the county-seat of Fayette co., 98 mi. s. of Cincinnati, Ohio, on the Chesapeake & Ohio, the Louisville & Nashville, the Southern and other railroads. The city is in the famous "blue grass region" and is the chief market for the products of that section. The principal manufactures are bourbon whisky, saddlery, flour, canned goods, lumber and wagons. In 1905 natural gas was brought to Lexington through a pipe line from Menifee County. This has given an impetus to manufacturing by offering cheap fuel. Lexington has a good public library and is an important educational center, being the seat of Kentucky University, Sayre Female Institute, Hamilton and Campbell-Hagerman female colleges, Saint Catherine's Academy, the Kentucky State University and the Kentucky reform school. The charitable institutions are the state asylum for the insane, Saint Joseph's Hospital, an industrial home for negroes and the Good Samaritan Hospital. Henry Clay had his home in Lexington for many years. The first settlement was made in 1779 by hunters. In 1782 the town was incorporated, and when Kentucky became independent it was made the capital. Population in 1910, 35,099.

Lexington, MO., a city and the county-seat of Lafayette co., 40 mi. e. of Kansas City, on the Atchison, Topeka & Santa Fé and the Missouri Pacific railroads. The city is situated on the Missouri River and is in the center of the hemp-growing region. It contains the Wentworth Military Academy, Central Female College and

Lexington

Baptist Female College. To the northeast of the city is a hill which is interesting from a historical point of view, being the place where 3000 Union soldiers under Colonel James Mulligan sustained a siege against 18,000 Confederates under General Sterling Price. They were at last compelled to surrender. Lexington was settled in 1825 and was incorporated in 1830. Population in 1910, 5242.

Lexington, BATTLE OF, the first battle of the Revolutionary War, fought at Lexington, Middlesex County, Mass., April 19, 1775. A British force of 800 soldiers had been dispatched by General Gage to seize the stores which had been collected at Concord by the colonists and to capture Samuel Adams and John Hancock, who were said to be in hiding at Lexington. News of the expedition was carried through the country by Paul Revere, who rode from Charlestown to Lexington. When the soldiers reached the latter point, they were confronted on the Common by about 70 militiamen. The British commander, Pitcairn, demanded that the company disperse, and some one, minuteman or grenadier, fired a shot. A brief skirmish ensued, in which eight militiamen were killed and ten wounded. At Concord the British found the stores removed and encountered another force of about 400 militiamen, who forced them to make a rapid retreat towards Boston. On the route they were constantly harassed by bands of farmers who fired upon the British columns from behind rocks and trees. The loss to the British was 273 men.

The village of Lexington is 11 mi. n. w. of Boston, on the Boston & Maine railroad. Its population in 1910 was 4918.

Leyden or Leiden, *li'den*, a city of the Netherlands, 22 mi. s. w. of Amsterdam. The most important educational institution is the university, formerly one of the most famed in Europe. It is attended on the average by about 900 students, nearly one-half studying law. Leyden has cloth and other manufactures, although it is no longer famous for its textiles, as it was during the fifteenth century. The historical event for which Leyden is most famous is the siege by the Spaniards in 1573-1574 and the relief by the prince of Orange, who had the dikes opened and the country flooded. The Pilgrims started from Leyden to found the colony at Plymouth, Mass. Population in 1910, 59,114.

Leyden Jar, an early form of electric accumulator, introduced to the scientific world by

Libby Prison

Muschenbroek of Leyden in 1746; hence its name. It consists of a glass jar, coated inside and outside, usually with tin foil, to within a third of the top. The mouth is closed by a wooden cover. A metallic rod, with a knob at the top, is fixed into the cover and is made to communicate with the inside coating; when the jar is to be charged the knob of this rod is applied to the prime conductor of an electric machine and the two coatings are brought into opposite electrical states, the inside being positive and the outside negative. The jar is discharged by establishing a communication between the outside coating and the knob. When a number of jars are placed in a box lined with tin foil connected with the earth, their knobs being joined together, they form a *battery*. A quantity of electricity equal to the sum of the charges which would be received by each jar can be collected in such a battery, capable of melting fine metallic wires, puncturing plates of glass or cardboard, killing animals and rupturing bad conductors. See **ELECTRICITY**.

Lhasa or Lassa, *lah'sah*, the capital of Tibet, situated on the Kyi-ch'u, a tributary of the Brahmaputra. All the public edifices worthy of notice are connected with the Buddhist religion, as Lhasa is a great center of Buddhism and is visited by thousands of pilgrims from China, Turkestan and Nepal. Lhasa is the principal emporium of Tibet, silk stuffs, tea and other articles being here exchanged for Tibetan, Indian and European goods. Late in the eighteenth century a law was established that no foreigner should enter the city, but it was entered by British forces under Colonel Young-husband in 1905. Population, about 10,000.

Lia'nas, a name common to any of those twining and climbing plants which grow in great profusion in the hot, moist climate of the tropics. Here in many cases the lianas overtop the highest trees and make an impenetrable network of an entire forest by their cable-like stems.

Libau, *le'bow*, an important seaport of Russia, in the Province of Courland, between Lake Libau and the Baltic Sea. Its trade in corn, flax, hemp and other products is considerable. Population, in 1904, 64,502; in 1910, estimated, 72,000.

Lib'by Prison, a military prison in Richmond, Va., used by the Confederacy during the Civil War. It was originally a tobacco warehouse, was first used as a prison after the first Battle of Bull Run and was constantly in service from that time until the end of the war. At times there were twelve hundred prisoners in the build-

ing, and their crowded condition caused much suffering. Many attempts to escape were made by prisoners, and in February, 1864, more than one hundred prisoners escaped through a tunnel which had been excavated by some of their number. About sixty of these reached the Federal lines, but the remainder were recaptured. The building was taken down in 1888, carried to Chicago and there rebuilt, brick by brick, being opened in the following year as a war museum. It was later demolished.

Li'bel, in law, the act of publishing malicious statements with the intent to expose persons or institutions to public hatred, contempt or ridicule. The difference between libel and slander is that in the former case the defamation must have been in writing, printing or in some other visible manner, while in the latter the offense is committed verbally. Publication is held to have taken place if the libel is seen but by one person other than the person libeled. In criminal law it is a misdemeanor to publish, or threaten to publish, a libel; or as a means of extortion, to offer to abstain from or to prevent others from publishing a libel. In the United States the punishment for this offense is imprisonment, fixed by statute in the different states. If the charges contained in the libel are true, a civil action cannot be maintained, though the defendant may still be held for a criminal offense. In a civil action the plaintiff recovers damages, the amount of which is settled by the jury. Recent legislation and decisions in this branch of law in Great Britain and the United States have a tendency to limit liability for action to purely false, scandalous and malicious libels. Truth, if published with good motives and for justifiable ends, is now admitted as a good defense; and even an innocent motive alone is so considered, though the statements may prove untrue.

Lib'eral, in politics, one who claims to represent the principles of freedom, reform and progress. The main objects of liberal agitation and legislation are to extend the principles of democracy. Most European countries have powerful liberal parties, and liberalism is rapidly spreading, particularly in Great Britain, Germany, Italy, Spain, Holland, Norway and Sweden. In Great Britain, the Liberal party is the lineal descendant of the Whigs and stands for economy and constitutional reform. It is strongest in Scotland and Wales and is almost always in a minority in England. The greatest of modern Liberal leaders was W. E. Gladstone, but his introduction, in 1886, of the Irish Home Rule

and Land Purchase bills alienated some of his most able supporters and led to the formation of the Liberal Unionist Party. The Liberals, led by Campbell-Bannerman, won a sweeping victory in England in 1906, on the principle of the maintenance of free trade. The Radicals consist of a branch of the Liberals, who demand more sweeping reforms than others of their party. The party opposed to the Liberals is the Conservative party.

Liberal Republican Party, the name given to a coalition of political factions during the presidential campaign of 1872. It was organized by Missouri Republicans under Carl Schurz and B. Gratz Brown, as a protest against the reconstruction policy of Congress and in favor of tariff reform and civil service reform. The national convention was held in January, 1872, at which Horace Greeley was nominated for president and B. Gratz Brown for vice-president, the issues being the same as in Missouri, with the omission of the tariff question. The Democratic convention accepted the Liberal Republican candidates; but a small Democratic element made independent nominations. After a campaign remarkable for its bitterness and for the widespread interest it aroused, Greeley was overwhelmingly defeated, and the party did not reappear in politics.

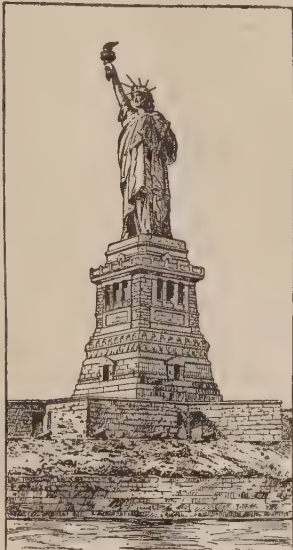
Libe'ria, a negro republic on the west coast of Africa, founded in 1822 by liberated American slaves, under the auspices of the American Colonization Society, and recognized as an independent state in 1847. The area is about 35,000 square miles, or a little less than that of Indiana. The soil is fertile, well watered and highly adapted to the cultivation of all tropical products. The chief crop is coffee, increasing quantities of which are grown from year to year and exported, other exports being palm oil, groundnuts, caoutchouc and ivory. The constitution of the Republic is modeled after that of the United States. The capital is **Monrovia**. The population is estimated at 1,500,000, of which perhaps 20,000 are civilized negroes.

Liberty, **STATUE OF**, a huge bronze statue on Bedloe's Island, in New York Harbor. It was presented to the United States by the people of France in commemoration of the one hundredth anniversary of American independence. It was placed on the island in 1885 and was dedicated in the following year. The Statue of Liberty is the largest statue in the world and represents a female figure with a torch. From the base to the top of the torch the statue is 151.41 feet

high. A stairway in the inside of the statue leads to the head, and there is a branch stairway within the extended arm. It was designed by Frederic Bartholdi. The complete name, given it by its donors, is "Liberty Enlightening the World."

Liberty Bell, the bell which hung originally in Independence Hall, Philadelphia, and which first pealed forth the news of the signing of the Declaration of Independence. It was cast in England in 1752, and bears the inscription: *Proclaim liberty throughout all the land unto all the inhabitants thereof.* (Lev. xxv, 10). It was cracked at its first ringing, was recast in 1753 and was again cracked while tolling on the funeral day of John Marshall, July 8, 1835. It is on exhibition at Independence Hall, Philadelphia, but has been shown at several recent exhibitions.

Liberty Party, a political party organized in the Northern states of the Union about 1839, its purpose being to oppose slavery by means of political action. Its formation in reality voiced a protest against the non-resistant and non-participant attitude of Garrison and his radical followers. James G. Birney was the first candidate of the party for president, being originally nominated at a small local convention in New York State and afterward endorsed by a so-called national convention at Albany, N. Y. The ticket polled only about 7000 votes, more than one-third of which were cast in New York State. In 1844 a more representative convention assembled and again nominated Birney for president. In this election the Liberty party polled 62,000 votes. Moreover, by drawing many votes from the Whig party in New York, it defeated Clay and elected James K. Polk. Its last candidate was John P. Hale, who, however, withdrew after Van Buren's nomination by the Free-Soil party in 1848.



STATUE OF LIBERTY

Li'bra (the balance, or scales), the seventh sign of the zodiac, into which the sun enters about September 23, the time of the autumnal equinox. In ancient astrology the symbol (♎) represented a pair of scales.

Li'brary, the name given to a collection of books and to the building in which it is located. Libraries existed in ancient Egypt and Assyria, and Pisistratus is said to have established a free public library at Athens in the fifth century B. C. Cicero and various wealthy Romans made collections of books, and several Roman emperors established libraries, partly with books obtained as spoils of war. In the fourth century A. D. there were twenty-eight public libraries in Rome, besides many private collections, the librarians of which were slaves or freedmen. The barbarian invasions destroyed all these libraries. The most celebrated library of antiquity was the Alexandrian (See ALEXANDRIAN LIBRARY).

Through the Middle Ages the chief libraries were those of the monasteries. Every Benedictine nouse had its collection of books and its corps of copyists. Many of the famous libraries of modern Europe originated in these monastery collections. The universities of the fourteenth century found libraries indispensable; and by the middle of the fifteenth, public city libraries were in existence. The invention of printing gave a great impetus to the collecting of books, as copying manuscripts by hand had made them exceedingly expensive.

The principal libraries of modern times are the National Library at Paris, the largest in the world, with about 3,500,000 books and over 100,000 manuscripts; the British Museum Library, London, with more than 2,000,000 books and 100,000 manuscripts, and the Imperial Library at Saint Petersburg, with over 1,500,000 volumes and 33,000 manuscripts. The Royal Court Library at Munich, the Library of Congress at Washington and the Royal Library at Berlin have each over 1,250,000 volumes and thousands of manuscripts. Other great libraries are the Imperial Library at Vienna; the royal libraries at Copenhagen, Stuttgart, The Hague and Brussels; the university libraries of Oxford, Cambridge, Paris, Göttingen, Leipzig and Heidelberg, and the libraries of Moscow, Madrid, Florence and Edinburgh. The Vatican Library, Rome, and the Bodleian, at Oxford, are particularly rich in rare books and manuscripts. The spread of education has called into existence innumerable smaller libraries, general in scope, or institutional, with books

Library

selected for special classes of readers. Naturally the widest provision for such libraries is found in countries having the best educational systems, as the United States, France, Germany and Great Britain.

Harvard College, founded in 1636, really started from the gift of John Harvard's library in 1638; Yale began in 1700 with a library; nineteen other college libraries were founded in the colonies before 1800, when the largest library in the United States, that of the Library Company of Philadelphia, contained only 15,549 volumes. Now there is a free library in almost every town; there are great libraries in the larger universities, libraries in the colleges, in many schools and in clubs. According to the reports of the bureau of education, there are in the United States nearly 6000 libraries which have 1000 or more volumes each. Massachusetts has a free lending library in every town, and the Public Library of Boston, long the first, is now the second largest free circulating library in the world (See BOSTON, subhead *Buildings*). The following table gives the largest United States libraries, with their number of volumes according to the latest available statistics, but additions are constantly being made:

Library of Congress.....	2,012,393
New York Public Library	1,229,383
Boston Public Library	1,000,000
Harvard University Library.....	980,275
Yale University Library.....	893,937
Chicago Public Library.....	481,708
Brooklyn Public Library.....	480,000
Columbia University Library.....	450,000
Cornell University Library.....	409,700
University of Chicago.....	400,000
University of Pennsylvania Library...	352,674
Princeton University Library.....	296,000
Enoch Pratt Free Library of Baltimore	285,500
Newberry Library, Chicago.....	280,000
Free Library of Philadelphia.....	265,600
Mercantile Library, New York City ..	250,000
University of California Library.....	210,000

Increase in the number of libraries has been followed by better facilities for the distribution of books among the people. In cities, through branch libraries and substations, books are supplied from the central library by library wagons. New York has 40 branch libraries; Brooklyn, 27; Boston, 10 branches and 16 delivery stations; Chicago, 26 branches and 54 stations, and Saint Louis, 68 stations. New York state provided for rural districts in its library law of 1835, giving aid equal to the amount raised in each district, and twenty-one other states established school district libraries;

Library of Congress

but this system failed, owing to the small amounts raised in each district. The Illinois statute of 1872 set a new standard, providing library support by taxation, and was followed in many states. Since 1890 twenty-three state library commissions, or their equivalents, have been established, and these in New York and the West reach the rural districts through traveling libraries. The commission selects the books, buys them at the expense of the state and arranges them in small collections in boxes or cases, so constructed that they can be readily transported from place to place. The only expense to those wishing to use them is the cost of transportation. In New York, Wisconsin and Minnesota these traveling libraries have been a remarkable success.

In many cities and towns there are also circulating libraries conducted by private enterprise. The books are owned by some individual or corporation and loaned to patrons at a nominal charge. These circulating libraries usually charge a fixed fee for each day that a book is kept out. Three to five cents a day is an average charge. Some libraries charge a uniform fee for a fixed period of time or less.

Library of Congress, a library at Washington, D. C., established by the United States government in 1800. It was destroyed in 1814 at the burning of the capital by the British, but received a new start with the purchase of the library of Thomas Jefferson. It was again partially destroyed in 1851, but since that time it has constantly increased in extent and value, until in 1912 it contained 2,012,393 printed books and pamphlets, besides 500,000 pieces of music, maps, charts, photographs, engravings and manuscripts. It is the largest library on the western hemisphere and one of the finest in the world. It is especially rich in history and political science and in collections of American newspapers. The library is replenished through regular appropriations by Congress, through gifts and exchanges and through the addition of copies of all books copyrighted in the United States. In 1897 the library was removed from the Capitol to a special building begun in 1889 and completed at a cost of \$6,500,000. It stands just east of the Capitol building. Its ground plan is oblong, covering $3\frac{1}{2}$ acres of ground, and is has a floor space of more than 8 acres. The building is of Concord granite on a framework of steel, and the interior walls are encased and decorated wholly with stucco and marble. The vast copper dome terminates 195 feet from the

ground in a gilded torch of learning. The decorations represent the finest work of American artists, more than forty of whom were engaged upon the work at different times. The building is considered to be the finest library building in the world.

License, *li'sens*, in law, the grant of permission to do some act, otherwise unlawful; also the document conferring such authority. All civilized countries require that persons should not carry on certain trades or professions or do certain acts, without previous grant of license, and such licenses are imposed for the sake of regulating traffic and raising revenue. The most common licenses are issued to empower persons to sell such articles as liquors and tobacco, to peddle or to assemble in public meetings. In regard to the sale of liquor, the license question has become of great importance in the United States, as the source of a heated controversy between the *Prohibitionists*, who would forbid the liquor traffic; the advocates of *low license*, who would collect a license as a source of revenue, but not for regulation, and the advocates of *high license*, who would collect the license primarily for regulation of the business and secondarily for revenue. In different states of the Union all of these systems are in use. See PROHIBITION PARTY; LOCAL OPTION.

Lichens, *li'kenz*, a very extensive order of flowerless plants. According to the well-established modern theory, lichens are composed of both algae and fungi, the latter parasitic on the former and yet living with them in a way that seems to be mutually beneficial. The lichens have neither stem nor leaves, but consist mainly of a leaf-like thallus, which derives its nourishment from the air. Probably 4000 species of lichens have already been described, and doubtless more will be found. They are gray, yellow or brown in color, and they sometimes present a beautiful and varied appearance. They are



A LICHEN

found in greatest variety in high mountain regions and in Polar lands, where they are the principal form of vegetation. Some species are widely distributed, being found in almost all parts of the northern hemisphere. Some are valuable articles of food, as the Iceland moss, which grows abundantly in the northern regions, and the so-called reindeer moss, which is the chief article of food for reindeer and other animals during the cold winters. Several dyes and litmus, so extensively used in chemistry, are lichen products. The chief service which the lichens perform in nature is to pave the way for plants of higher orders. They are able to derive their subsistence from the air. Growing as they do upon exposed rocks and in barren soil, they dissolve the rock and soften the soil, and in time, when their decaying bodies mix with the soil, they enrich it so that more highly developed plants can grow there.

Lick, JAMES (1796-1876), an American philanthropist, born in Fredericksburg, Pa. He engaged in the manufacture of pianos and in 1847 settled in California, where he accumulated a large fortune by real estate investments. In 1874 he placed \$3,000,000 in the hands of trustees, for use in the promotion of educational enterprises. Of this, \$540,000 was given for a school of mechanical arts and \$700,000 was granted to the University of California for an observatory, which was to contain the largest telescope in the world at that time. See LICK OBSERVATORY.

Lick Observatory, *ob zurv'a to ry*, an astronomical observatory in California, situated on Mount Hamilton, 4285 feet above sea level, and about 25 miles east of San José. The telescope is the second-largest refracting telescope in the world, the objective having an aperture of 36 inches, being exceeded only by the 40-inch telescope of Yerkes Observatory at Lake Geneva, near Chicago. The point of suspension of the telescope tube is 36 feet from the floor, and the diameter of the dome is 36 feet. The sum of \$700,000, left by James Lick, a San Francisco millionaire, was used for the erection and equipment of this observatory.

Licorice or **Liquorice**, *lik'o ris*, a name for several herbs of the family leguminosae. Though the purplish flowers are large and attractive, the plant is known best for its juice, prepared from the small, yellowish roots and most familiar in the form of a black, gummy substance, sold in sticks or lozenges. A great deal of the licorice sold in the markets is much adulterated with

cheaper materials, and this is especially true of that which comes from Spain.

Lic'tors, in Rome, were the public servants, usually freedmen, who attended upon the chief magistrates—dictators, consuls, praetors and proprae'tors—to clear the way for them and to



cause due respect to be paid to them. They carried axes tied up in bundles of rods, called *fasces*, as ensigns of office. The number of lictors depended upon the rank of the magistrate, a dictator having twenty-four, a consul twelve, a praetor two and a proprae'tor six.

Liebig, *le'biK*, JUSTUS, Baron von (1803-1873), one of the most eminent of modern chemists, born at Darmstadt, Germany. Through the favor of Humboldt, he was appointed, in 1825, professor of chemistry at the University of Giessen, a chair he held for twenty-five years. Later he held similar positions at Heidelberg and Munich. He is regarded as the founder of organic chemistry, owing to the many discoveries he made in this department. He did much to improve the methods of analysis; his *Chemistry*

of Food has brought about a more rational mode of cooking and use of food, while agriculture owes much to his application of chemistry to soils and manures.

Liechtenstein, *leeK'ten stine*, an independent state, lying between Austria and Switzerland, bounded on the n. and e. by Vorarlburg, on the s. and w. by the Swiss cantons of Grisons and Saint-Gall. The western boundary is the Rhine. The surface, except in the western part, is covered with mountains, branches of the Rhaetian Alps. The chief industries are agriculture, stock raising, weaving and the production of wines and various wooden articles. Since 1866 the principality has belonged to the Austrian Customs-Union. Population in 1909, 9854.

Liege, *le ayzh'*, a town of Belgium, capital of the province of same name, 54 mi. s. e. of Brussels. Liège is the principal manufacturing town of Belgium, its foundries and its firearm, metal and tool manufactures being very extensive. There are also important woolen mills, tanneries and printing offices. Liège was founded in the sixth century and by the end of the tenth century was so powerful that it was recognized as an independent principality. In 1830 it became a part of Belgium. Its ancient fortifications had long since been destroyed in the wars between 1000 and 1800, but in 1888 Liège was converted into one of the most powerful fortresses in Europe by the erection of twelve new forts. In 1914, however, these forts fell before the great German siege guns, which battered the defenses to pieces in a few days. Population in 1911, 167,676.

Lien, *leen* or *l'en*, in law, in its most usual acceptation, "the right which one person, in certain cases, possesses of detaining property placed in his possession belonging to another, until some demand of the one possessing the property is satisfied." In the United States liens are of two kinds: (1) *Specific liens*, where the person in possession of goods may detain them until a claim, which accrues to him from those identical goods, is satisfied; such are, the lien on baggage, possessed by hotelkeepers or common carriers; on goods sold but remaining in possession of the merchants; of workmen on the product of their labor. (2) *General liens*, where the person in possession may detain the goods, not only for his claim accruing from them, but also for the general balance of his account.

Life'boat, a special boat for saving persons from shipwreck. The first lifeboat was patented in Great Britain in 1785, but a very successful

improved form was introduced in 1789 and remained almost the only one in use till 1851. Since that time many improvements have been made, so that now strong and serviceable boats, so constructed that it is almost impossible to upset them, capable of carrying heavy loads and fully prepared for all the emergencies of a shipwreck, are in use at the life-saving stations on the coasts of the great nations. See LIFE-SAVING SERVICE.

Life Buoy, *boi*, a device intended to support persons who have fallen into the water, until assistance can reach them. The common life buoy consists of a ring of canvas, stuffed with cork. The ring is usually about 30 inches in diameter and has one or more loops on the outer rim, to which a life line can be attached. When in use the buoy is placed around the wearer under the arms. It is usually put on over the head and will assist the person to float for a long time. Another common style of life buoy consists of a sort of jacket, made of plates of cork covered with waterproof canvas. This is buckled around the body under the arms and serves the same purpose as the ring buoy. See LIFE-SAVING SERVICE.

Life Insurance, *in shoor'ans*. See INSURANCE.

Life-Saving Gun and Rocket. At nearly every life-saving station is a mortar, loaded with gunpowder and with a projectile with a line attached to it. The missile in one form is armed with curved barbs, something like the flukes of an anchor, which are intended to grapple the rigging or the bulwarks of a ship. The mortars may be discharged with accuracy at a range of from 700 to 1000 yards. A so-called *rocket* is also sometimes used. It is fired in the ordinary way, but in its head is a line that uncoils as the rocket speeds toward its mark. See LIFE-SAVING SERVICE.

Life-Saving Service. In 1871 the United States organized its present life-saving system, and now stations are located at points of danger on the Atlantic coast about five miles apart and at intervals wherever there is most danger on the Pacific coast and along the shores of the Great Lakes. There are now about 275 of these stations, of which about two-thirds are on the coasts of the Atlantic Ocean and the Gulf of Mexico. The buildings are firmly built structures, intended to weather any storm and, if necessary, to withstand the tides. Within are apartments for the life-saving crew and for such persons as may be saved from wrecks. Usually

the crew consists of a keeper and from six to eight men, who are required to be citizens of the United States between eighteen and forty years of age. The keeper is in care of the buildings and has the control of his crew, over whom he exercises rigid discipline and from whom he requires frequent drills, in order that the men may become expert in handling the apparatus. Each station is equipped with boats, which are always in readiness for launching and are equipped with hatchets, bailing buckets, life-preservers and various other appliances that may become necessary. Five or eight oarsmen handle the boat, which will carry from nine to twelve additional persons (See LIFEBOAT). When the lifeboat cannot be used, rockets and guns may be used (See LIFE-SAVING GUN AND ROCKET). When a line has been fastened to the ship in distress, a life buoy or life car can be sent out to the ship and brought back loaded with passengers. The breeches buoy is a circular contrivance from which depend a pair of short canvas breeches. It is so contrived as to be run along a line from the ship to shore, a single passenger being fastened in the buoy (See LIFE BUOY). All day and all night, especially in heavy weather, a strict lookout is kept for vessels in distress, both from the station and by the men who patrol the shore. The work done during a single year is remarkable. Several hundred vessels are warned away from dangerous places by the patrolmen each year, and the number of persons saved runs into the thousands, while the value of property reclaimed is estimated in the millions of dollars. Most of the foreign nations sustain similar organizations.

Lig'ament, in anatomy, a strong, tendinous, inelastic white body which surrounds the joints and connects bones, or which strengthens the attachments of various organs or keeps them together. Every joint is surrounded by a capsular ligament; the tendons at the wrist and ankle are bound down by what are called the annular ligaments. In dislocation of joints the capsular ligament is often broken.

Light, *lite*. Everyday experience tells us that we see objects by the aid of something that comes from them to the eye, and that this agent is thrown off by the sun and other bright objects. We call this agent *light*. Light is supposed to be the result of minute vibrations in a substance or medium called *ether*. Unlike the vibrations that produce heat, those which produce light run crosswise to the direction in which the lines of light travel. They are so minute that their

effect cannot be perceived by any organ except the eye.

WHERE LIGHT COMES FROM. So far as we know, light is given off only by very hot bodies. The sun is the great source of light, as well as of heat. The stars also are sources of light, a small portion of which comes to us. Other sources are chemical and mechanical action. The lights used to light our houses and streets are from one or the other of these sources. Candles, lamps and gas jets give off light by burning. The burning is caused by the union of the oxygen of the air with the carbon in the tallow, oil or gas. This is a form of chemical action. Electric lights are produced by friction, which is a form of mechanical action (See **ELECTRIC LIGHT**). Bodies that give off light are called *luminous*. Luminous bodies give off light equally in all directions.

HOW LIGHT TRAVELS. Light travels through substances of uniform density in straight lines, called *rays*. For this reason we cannot see through a bent tube or around the corner of a house. The velocity of light is so great that for all distances on the earth it is instantaneous. Light travels one hundred eighty-six thousand miles per second. It requires eight minutes and nineteen seconds for light to pass from the sun to the earth, but many of the stars are so far away that it requires a number of years for the light to reach us from some of them.

A substance which allows light to pass through it freely, like glass and water, is *transparent*.

A substance that will not allow light to pass through it, as iron, tin and black cloth, is *opaque*.

A substance which allows some light to pass through it, but not enough to enable us to see objects beyond it, as ground glass, white paper and white cloth, is *translucent*.

The brightness of light varies directly as the brightness of the luminous body and decreases as the square of the distance from the luminous body increases. A lamp having a flame four times as bright as a candle will give four times as much light; an object two feet from a lamp will receive four times as much light as it will when four feet distant.

REFLECTION OF LIGHT. When rays of light strike an object, some of them enter it, or are *absorbed*, and others are thrown back, or *reflected*. It is by the reflected rays that we see objects. A rough surface scatters the reflected rays more than a surface that is highly polished like a mirror. Strange as it may seem, objects that are poor reflectors can be seen more easily

than those that are good reflectors. The reflection of the object which we see in the mirror is an *image*. Rays of light are reflected at an angle equal to that with which they strike the reflecting surface. For this reason, images of objects mirrored in bodies of water are inverted. This can be illustrated by laying a mirror on a table and setting an object beside it. In Fig. 1, the ray from the top of the candle

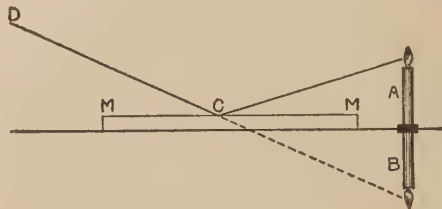


FIG. 1

A strikes the mirror *MM* at *C* and is reflected to the eye at *D*; the flame is seen in the direction of the reflected ray and appears near *B*. This is true of all the rays; so the image of the candle is inverted.

Light may be reflected a number of times. We see objects by the moonlight which they reflect, and we know that the moon's light is reflected from the sun. When we see an image in a mirror, the light from the object is reflected to the mirror and from that to the eye.

REFRACTION OF LIGHT. When a ray of light passes from one substance to another of a different density, it is bent out of its course, or *refracted*. If we stand a stick in a pail of water, it appears to be bent or broken at the surface of the water; the handle of a spoon in a cup of clear tea presents a similar appearance. The object is seen in the direction of the refracted ray. In Fig. 2, the stick *AB* appears bent at

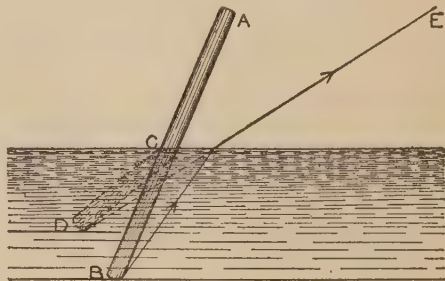


FIG. 2

C, on account of the refraction caused by the water. The eye sees the end *B* in the direction of the refracted ray, and it appears at *D* instead of where it really is. This is the reason why

the bottom of a vessel filled with water appears some inches above the support upon which the vessel rests.

When a ray of light passes through a triangular prism, it produces the effect shown in Fig. 3.

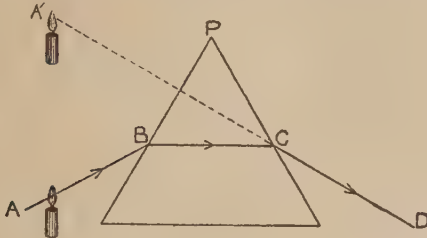


FIG. 3

The ray from *A* is refracted at *B* toward *C*. On leaving the prism at *C*, it is bent towards *D* and the candle is seen at *A'*.

The law of refraction is: When light passes from a rare to a dense substance, it is bent in the direction of a line that is perpendicular to the surface of the refracting body; when light passes from a dense to a rare substance, it is bent away from a line perpendicular to the surface of the refracting body.

Rays of light passing through a window pane are refracted twice, but in such a manner as to make them appear straight, as shown in Fig. 4.

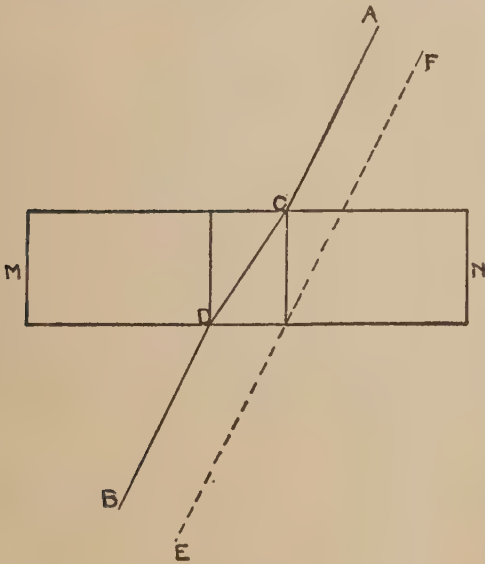


FIG. 4

The ray *AB* passing through the pane *MN* is refracted at *C* and *D*, but it has the same general direction as the line *EF*.

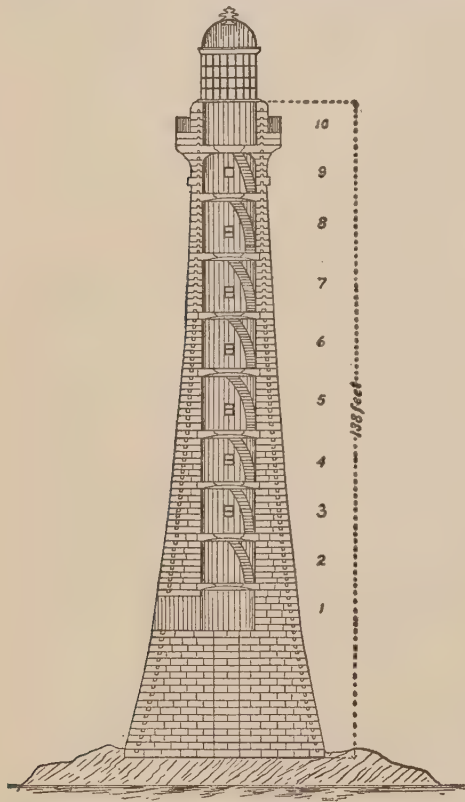
THE SPECTRUM. When sunlight is passed through a triangular prism, the rays are separated by refraction and form the colors seen in the rainbow. The band of color so formed is called the solar, or prismatic, *spectrum*. From this experiment we learn that white light is composed of seven colors (See **SPECTROSCOPE**). The explanation of the action of light is further illustrated in the articles **COLOR**; **LENS**; **MIRROR**; **POLARIZATION OF LIGHT**; **PRISM**; **RAINBOW**. For the application of the principles of light, see **CAMERA**; **MAGIC LANTERN**; **MICROSCOPE**; **SPECTROSCOPE**; **TELESCOPE**. For a new theory of light, see **ELECTRO-MAGNETIC THEORY OF LIGHT**.

Light-house, a tower or other elevated structure bearing a light at the top and erected at the entrance of a harbor or on some rock or headland to serve as a guide or warning of danger to navigators at night. The Pharos of Alexandria, erected about 300 B. c., is, as far as known, the first structure erected expressly for a lighthouse. This tower was so high that it was reckoned among the seven ancient wonders of the world. The Egyptians, Phoenicians, Greeks and Romans used systems of lights for the guidance and protection of their mariners, but during the Middle Ages these were lost with many other institutions of that ancient civilization. The lighthouse of Cordouan, at the mouth of the Garonne in France, founded in 1584 and rebuilt on an improved plan in 1727, can be considered as the forerunner of modern lighthouses. Its tower is 197 feet high, and it is a model of strength and neatness. The first lighthouse in the United States was erected in 1716, on the north side of the entrance to Boston Harbor. All seafaring nations now maintain elaborate systems of lighthouses.

CONSTRUCTION. The plan of a lighthouse and the material of which it is constructed depend upon its location and the distance to which it is necessary to throw the light. Wherever possible lighthouses are placed on high promontories or other sites on the mainland where they will be free from the action of waves, but many of them have to be located on very dangerous places and are subject to great strain from the waves and, in some instances, from floating ice. Lighthouses built in such positions are constructed of the strongest masonry. The tower is in the form of a truncated cone, gradually sloping as it ascends. The construction of the foundation is usually the most difficult and expensive part of the work, since it often happens that this must be laid under water, under such conditions that

the work can be done only during periods of low water and when the sea is quiet. After the foundation is completed, the tower rises with comparatively little difficulty. The stones are doweled and cemented together so as to make the walls particularly firm. For the strongest towers the walls at the base are usually five or more feet in thickness and gradually narrow until at the top they are about eighteen inches in thickness. The interior of the tower is usually lined with brick, and between the walls there is left a narrow space for dead air.

As shown in the illustration, a lighthouse is usually divided into the following sections: A



LIGHTHOUSE

1, Cistern and entrance; 2, fuel room; 3, workshop; 4, store room; 5, kitchen; 6 and 7, bell rooms; 8, office room; 9, oil room; 10, light room.

cistern, for storing fresh water; a storehouse for supplies; a shop; the living rooms, for the keeper and his family, and the lantern, which surmounts the tower. All of these compartments are connected with one another by stairways.

The lantern is the most important part of the structure, and it is for this that the tower is

erected. In all of the best lighthouses of modern construction, the lantern consists of a light metallic frame, holding in position a series of lenses and rings, which form the sides. In the largest lights this lantern is about twelve feet in diameter and ten feet high. The number of sides or faces depends upon the style of light desired. The simplest of these lanterns have but four faces, but they may have as many as eight or ten. The center of each face contains a large plano-convex lens (See LENS), and this is surrounded by a series of prisms, each of which is the portion of a ring and has its sides and edges so cut and curved as to reflect all rays of light which strike it from the lamp so that they will be parallel to one another. The lantern is mounted on a vertical shaft and is supported either in a tank of mercury or upon conical rollers which move over a hard, smooth metallic track. When in use the lantern is caused to revolve by clockwork, which is kept in motion by a weight. Lanterns of this style and of the best construction will throw light so that it can be seen for twenty miles. The light can be seen only when a face of the lantern is directly opposite the observer, hence a revolving light is a flash light, and in one revolution the lantern gives as many flashes as it has sides. By covering any side with red glass a red light is produced, and some lanterns are arranged to give red and white lights.

The lamp is a comparatively small structure. In small lanterns it resembles very closely the largest sized kerosene lamps having circular wicks, but in the larger lights the lamp contains two or more circular wicks arranged one within the other and each in its special tube. These lamps burn the best grade of kerosene.

Lighthouses of similar structure, containing stationary lights, with reflectors in the shape of a parabola or closely resembling those used in the headlights of locomotives, are found at numerous points on the coast, where an intense light is not required. In some localities, where there is no danger from the action of the waves or from ice, steel towers in the form of trestlework are used, and occasionally a wooden tower is found.

LIGHT-SHIPS. There are many places dangerous to navigation where a lighthouse cannot be erected, and light-ships are used to warn mariners of their approach to such points. The ship carries two or more reasonably high masts, from the top of which lights are suspended. It is moored near the point of danger and securely anchored so that it will be enabled to

ride out the severest storm without breaking from its moorings. One of these ships off the shoal at Nantucket is more than twenty-five miles from land. The keeper of the light receives his supplies through a lighthouse tender, which visits the ship and other lighthouses in its district at regular intervals.

MANAGEMENT. The lighthouses in the United States are under the control of the United States Lighthouse Board. This is an organization authorized by Congress in 1852 and consists of the secretary of the treasury, who is ex-officio its president, two naval officers, two engineers and two civilians of noted scientific ability. All are appointed by the president. All matters pertaining to lighthouses, buoys and other agencies for the protection of vessels in harbors and along the coast are in charge of this board. By them the country is divided into sixteen districts, each of which is under the management of a naval superintendent. Lighthouse tenders, which are vessels in the employ of the board, make periodical visits to all lighthouses. These ships carry inspectors who inspect the lighthouse and report upon its condition, and they also carry the needed supplies for the light and the keeper's family. See BUOY; FOG SIGNALS.

Lightning, *lit'ning*, a very bright flash of light between two clouds or between a cloud and the earth. Franklin proved that a flash of lightning was the same as a spark from the conductor of an electric machine (See ELECTRIC MACHINE), except that it is on a much larger scale. The clouds act as condensers upon which the electricity gathers, and when two clouds oppositely electrified approach each other, a discharge occurs. If the clouds are in the lower atmosphere, the discharge takes the form of a zigzag line of very brilliant light, the irregular path being caused by the fact that the discharge follows the line of least resistance. When a discharge occurs in the upper regions of the atmosphere, it frequently takes the form of a flash or sheet of flame. Since this form of discharge is usually seen during warm weather, it is called *heat lightning*. When a heavily charged cloud approaches the earth, the discharge frequently occurs between the earth and the cloud. This forms what is termed a *thunderbolt*.

The discharge usually follows some conductor, like a tall tree, chimney or building, and is usually so powerful as to damage or destroy the conductor. Following the thunderbolt there is a return shock, which establishes the equilibrium between the earth and the atmosphere. This

shock is usually felt for some distance around the point where the thunderbolt strikes, and it is this, rather than the bolt itself, that causes many of the effects produced by the discharge, such as throwing people down, or stunning them, breaking glass and doing other damage. Sometimes the return shock is sufficiently powerful to kill men and animals. Thunder is due to the sudden disturbance of the air, produced by the discharge. The long rolling effect is probably due to echoes from the clouds, but it may be due partly to a number of discharges at different distances from the observer. The report following a thunderbolt resembles that of a cannon. See LIGHTNING ROD.

Lightning Rod, an instrument by means of which either the electricity of the clouds, the cause of lightning, is conducted without explosion into the earth, or the lightning itself is received and conducted quietly into the earth or water without injuring buildings, ships or other structures upon which the rod is placed. The lightning rod was invented by Benjamin Franklin about 1752, and it met with general adoption. It usually consists of a stout iron rod, with one or more points at the top, the lower end being metallically connected with thick strips of copper or iron, which are carried into the ground to a considerable depth and laid, if possible, in water or wet earth. The rod is insulated from the building by passing through glass insulators, which are attached to the supports. See LIGHTNING.

Light-Ship. See LIGHTHOUSE, subhead *Light-Ships*.

Lig'nite. See COAL, subhead *Lignite*.

Lig'urite, a mineral occurring in oblique rhombic prisms, of an apple-green color, occasionally speckled on the surface. It is so called on account of its being found chiefly in Liguria. Its color, hardness and transparency have caused it to be classed as a gem.

Li Hung Chang, *le hoong chahng*, Earl (1823?-1901), a Chinese statesman. As governor of the Kiang provinces, he put down, in conjunction with General Gordon, the Taiping rebellion. He was viceroy of the Province of Chi-li and senior grand secretary of state from 1870 to 1894. Earl Li was commander of the Chinese forces during the war with Japan and negotiated the treaty of peace. In 1896 he represented his government at the coronation of the czar and visited the United States. After he had returned to China he became the real head of the foreign office. In 1899 he was decorated

Lilac

with the Double Dragon, an unusual honor, and in 1900 he was appointed with Prince Ching to negotiate a treaty with the foreign powers operating in China. Li Hung Chang was one of



LI HUNG CHANG

the foremost diplomats and statesmen of his age, and he managed the affairs of his country with consummate skill. He was a friend of Western culture, and to him is due much of China's progress.

Li'lac, a shrub belonging to the olive family, cultivated commonly in gardens for its large clusters of fragrant flowers. Many varieties are known, both single- and double-flowered, and white, blue or purple in color. The common lilac, which was introduced into Europe from northern Persia, grows freely in almost any good soil and spreads rapidly by means of suckers.

Liliuokalani, *le le oo'o ka lah'ne*, LYDIA KAMEKEHA (1838-), the last independent ruler of the Hawaiian Islands. She succeeded her brother, King Kalakaua, in 1891, but she immediately aroused the greatest antagonism among her subjects by a policy of reaction against the liberal laws which had prevailed. A body of white citizens of the islands finally deposed her in January, 1893, and organized a republic, with Sanford B. Dole, an American, at its head. The new government desired annexation to the United States, but this was opposed by President Cleveland, who declared that United States forces had been instrumental in establishing the Republic and demanded the restoration of the

Lily of the Valley

queen to power. This demand was not heeded, however, and the queen was compelled to retire to her private estates in Honolulu. See HAWAIIAN ISLANDS, subhead *History*.

Lille or **Lisle**, *leel*, a fortified city of France, capital of the Department of Nord, situated on the Deule, 155 mi. by rail n. by e. of Paris. The city is well built and contains a number of public squares and open places. Among the chief public buildings are the Renaissance town-hall; the Porte de Paris, which was built in the seventeenth century to commemorate the union of French Flanders with France; the Palais des Beaux Arts, and a number of prominent churches. The city is the seat of a Protestant university and of a Catholic university; also of an Institute of Technology and a Pasteur Institute. The municipal library contains 100,000 volumes, and the city has a number of museums of natural history and archaeology. Lille is one of the leading cities of France in the manufacture of textiles, and its mills produce large quantities of linen and cotton goods. Other important industrial establishments are machine shops, sugar refineries and chemical works. The city is strongly fortified, its forts having a circuit of about thirty miles. Population in 1911, 217,807.

Lil'y, the common name of a large family of plants and also of the characteristic genus of that order. The leaves and stem are produced from a scaly bulb and bear at the summit flowers which are in many species large and elegantly formed. The typical lily has a colored perianth of six parts, either tubular with spreading divisions, bell-shaped or with re-curving parts. Many of the lilies are common in cultivation and are among the favorite plants of the gardeners, though some which are commonly known by the name of lily belong to very different families, as, for instance, the calla and the water lily. White lilies are universally regarded as emblems of purity and innocence, and among these are the Easter, or Bermuda, lily, the Mediterranean lily and the beautiful Chinese and Japanese varieties, with their rosy or golden markings. In the United States there are about twelve native species, four of which grow east of the Mississippi. These are red or orange-red in color, spotted, or mottled, with dark shades or black.

Lily of the Valley, a beautiful little plant of the lily family. It bears a dozen or more small, white, bell-shaped flowers on a slender stalk, which rises from between two large, dark-green leaves. Its beauty and the pleasing fra-

Lima

grance of the flowers make the lily of the valley one of the most popular of cultivated plants. Under favorable conditions it spreads rapidly in



LILY OF THE VALLEY

rich gardens and requires very little attention. Florists force the plant to bloom at all seasons of the year, but in outdoor gardens it appears early in the spring.

Lima, *le'mah*, the capital of Peru, is situated on the Rimac, 7 mi. from Callao, its port on the Pacific. Among the chief buildings the most notable is the cathedral, begun in 1535. The houses are for the most part built of adobe, with plaster stuccoes. The manufactures are unimportant, but there is a considerable import and export trade through the port of Callao. The climate is very agreeable, but the locality is subject to earthquakes. Lima was founded in 1535 by Pizarro and was called Ciudad de los Reyes (City of the Kings). In January, 1881, Lima capitulated to the Chileans, who occupied it for two years. Population in 1908, 140,884.

Li'ma, OHIO, the county-seat of Allen co., 72 mi. s. w. of Toledo, on the Ottawa River and on

Lime Light

the Cincinnati, Hamilton & Dayton, the Erie, the Pennsylvania and other railroads. The city is in the great petroleum and natural gas belt of the state and ships large quantities of oil. It contains extensive railroad shops, locomotive and car works, machine shops and refineries. Lima College is located here. Population in 1910, 30,508.

Lime, a small globe-shaped lemon, the fruit of a shrub about eight feet high. It is a native of India and China, but was introduced into Europe long before the orange and is now extensively cultivated in the south of Europe, the West Indies and some parts of South America. The fruit is agreeably acid, and its juice is employed in the production of citric acid and in the preparation of beverages.

Lime, the oxide of calcium, produced by heating limestone, or calcium nitrate. Pure lime is perfectly white, has the properties of a strong lye, dissolves slightly in water and is not affected by heat. The ordinary quicklime of commerce is made by heating some varieties of limestone in kilns. The heating drives off the carbon dioxide and leaves the lime. The limestone is usually put in at the top of the kiln, and the lime is taken out at the bottom. This lime is not pure, but answers for most purposes for which lime is used. The best quality is obtained from marble. Hydraulic lime is obtained by burning limestone that contains some silica and clay. When burned, these substances form with the lime a compound which hardens under water.

Lime is used for making mortar, cements, glass and numerous other commodities. It is also used in tanning, to remove the hair from skins; for a fertilizer, in the manufacture of soap and as a flux in smelting ores. Slaked lime is made by pouring water upon quicklime. Unless used immediately, slaked lime absorbs carbon dioxide from the air and becomes worthless. The limewater used in medicine is prepared by dissolving a small quantity of pure lime in water. See CEMENTS; METALLURGY; MORTAR.

Lime Light or **Oxyhydrogen Light**, a brilliant light, produced when a jet of mixed hydrogen and oxygen gas is ignited and directed on a solid piece of lime. It is commonly used in magic lantern exhibitions; and the two gases are kept in separate air-tight bags or iron cylinders, into which the gas is forced under very high pressure. From these receptacles, tubes conduct the gases to meet in a common jet. Elec-

Limerick

tric light has largely taken the place of the lime light.

Lim'erick, a city of Ireland, capital of Limerick co., and itself a civic county. It is built on both sides of the Shannon and is 106 miles south-southwest of Dublin. The three parts into which the city is divided are known as English-town, Irishtown and Newtown Pery. The industries include the curing of bacon, flax spinning and weaving and lace making. There are distilleries, breweries, tanneries, corn mills, a large military clothing establishment and ship-building slips. Limerick is the leading port on the west coast of Ireland for the shipment of produce. Population in 1911, 38,403.

Lime'stone, a common rock, composed of lime and carbonic acid. The ordinary limestone is of a grayish color and is somewhat coarse-grained, but there are many varieties, varying in color from white, as in the pure marble, to black. The pure limestone forms in crystals, which from their form are often called dog-tooth spar. Iceland spar is another pure variety. When changed by heat in the earth, limestone becomes marble (See MARBLE). Limestone forms about three-fourths of the sedimentary rocks. It is not so hard as granite, but is strong and constitutes an excellent building stone for foundations and walls where a nice finish is not required. It is also used as a flux in smelting iron ore, in the manufacture of glass and for making quicklime (See LIME). Acid is a good test for limestone, since it always effervesces when acid is applied.

Limoges, *le mohzh'*, a town of France, capital of the Department of Haute-Vienne and former capital of Limousin. The principal industry is the manufacture of artistic porcelain, known as Limoges ware. About 6000 men are employed in making this porcelain. There are also wool and cotton spinning mills, cloth factories, foundries, paper mills and extensive shoe and clog making establishments. Limoges is the seat of a bishop. Population in 1911, 92,181.

Li'monite, a very important ore of iron, the varieties of which are bog iron ore and brown hematite. It is of a brownish color, occurs in rounded masses and is found in various parts of England and abundantly on the Continent and in America. See HEMATITE.

Lim'pet, a mollusk which adheres to rocks, partly by the suction of its broad, disk-like foot and partly by a sticky secretion. The common limpet is often found sheltered in a shallow bed, excavated by itself out of the rock. From this

Lincoln

pit the limpet, when covered by the tide, makes short journeys in search of its food, which consists of algae, which it eats by means of a long, ribbon-like tongue, covered with rows of hard teeth. The limpet is used as bait by fishermen and is eaten by the poorer classes of Scotland and Ireland. Some of the tropical limpets grow to be about a foot wide.

Lincoln, *link'on*, capital of Lincolnshire, England, 130 mi. n. w. of London. The city is very imposing in appearance, being situated on a hill which is crowned by the cathedral. Among the interesting buildings are the remains of the Norman castle, the palace and stables of John of Gaunt and the townhall. The cathedral, which is one of the finest in England, has three towers, two of which are 180 feet in height and the third 300 feet high. In the central tower hangs the famous bell called Tom of Lincoln. The city has several schools and charitable institutions. There are several iron foundries, manufactories of steam engines and agricultural machines, and large steam flour mills. It is the center of an important trade in live stock, corn and wool. It is also noted for the horse races which are held here. Under the Romans and also under the Saxons and Danes, Lincoln was a place of importance, being specially famous in the time of the Norman conquest as a place with an extensive shipping trade. Population in 1911, 57,285.

Lincoln, ILL., the county-seat of Logan co., 29 mi. n. e. of Springfield, on the Chicago & Alton and the Illinois Central railroads. The city is in a farming region, near extensive deposits of coal. The chief manufactures are of flour, horse collars, mattresses, caskets, clay products, excelsior and cellulose. Lincoln University is located here, and the city has a Carnegie library, several hospitals and children's homes, including the state institution for imbecile children. The place was settled in 1835 and was incorporated in 1854. Population in 1910, 10,892.

Lincoln, NEB., the capital of the state and the county-seat of Lancaster co., 55 mi. s. w. of Omaha, on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Chicago & Northwestern and other railroads. The most prominent buildings are the capitol, the Federal building, the courthouse, Saint Elizabeth's Hospital and a Carnegie library. There are excellent railroad facilities, making the city an important distributing point; the water is of good quality, being of the artesian type. Flour, furniture,

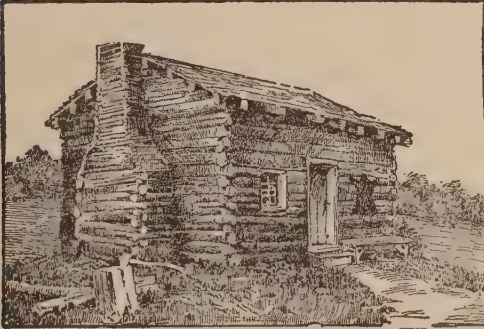


ABRAHAM LINCOLN

Lincoln

leather goods, brooms, farm implements, paints, creamery products and clothing are the chief manufactures. Lincoln is renowned as being one of the few prohibition capitals; it is an important educational center, there being located here the University of Nebraska, Nebraska Wesleyan University, Cotner University, Union College, the Nebraska Military Academy and two large Chautauquas—Bethany Assembly and the Epworth Assembly. The site was chosen for the city in 1859. It was made the capital and named in honor of Abraham Lincoln in 1867. Population in 1910, 43,973.

Lincoln, ABRAHAM (1809-1865), an American statesman, sixteenth president of the United States. He was born February 12, 1809 in a cabin on Nolin Creek, Hardin County, Ky. His ancestors were Quakers. His parents, who had lived amid the rude surroundings of the Kentucky frontier, had had little opportunity to



LINCOLN'S BIRTHPLACE

acquire an education, but were simple, industrious, kindly people, who desired for their son the opportunities which they had lacked. At the age of seven, Lincoln was taken by his parents to Spencer County, Ind., where his mother died in 1818. In the following year, his father married again, and the stepmother took an affectionate interest in Abraham's life and encouraged him to study. For ten years after going to Indiana, Lincoln took up a variety of humble employments; in 1828 he made a voyage to New Orleans on a flat-boat, and after the family's removal to Macon County, Ill., in 1830, he helped his father clear a farm, there laying the foundation for the nickname *rail splitter*, which in after life assisted him in his candidacy for public office.

Up to this time he had received less than one year of regular schooling, but he now devoted himself to the study of law, while acting as clerk, grocer, surveyor and postmaster at New Salem.

Lincoln

In 1832 he enlisted in the Black Hawk War, was promoted to captain and served for three months. After his return, he was a candidate for the legislature and was defeated, but was elected in 1834 and was reelected for three successive terms. He was admitted to the bar in 1837 and began practice at Springfield, the state capital. He married in 1842 and soon began an active career in politics. Finally, in 1846, he was honored with election to the House of Representatives. He served but one term and did not win particular distinction, but voted consistently against the slavery party.

It was not until 1854 that he devoted himself in earnest to the struggle against the extension of slavery. In that year he met Douglas in a debate before the Illinois legislature over the Kansas-Nebraska Bill, winning such fame by his remarkable logic and forceful expression that he was made the anti-Nebraska candidate for senator. He was defeated by Lyman Trumbull. In 1856 his name was pressed for vice-president on the Republican ticket with Fremont, but he was defeated. Two years later occurred the famous series of public debates by which, though defeated in his candidacy for senator, he attracted the attention of the whole country. In them he displayed not only admirable sincerity and insight, but exceptional political shrewdness, and it was not long before his name was prominently mentioned as a candidate for president. His famous Cooper Union speech in 1860 at New York made him the most conspicuous figure in Republican politics, and at the convention at Chicago, after a spirited contest with Seward, Chase, Cameron and Bates, he was nominated upon a vigorous anti-slavery platform. The campaign which followed was one of the most momentous events in the history of the United States. The Democratic party, having been disorganized and divided, presented two candidates, Douglas and Breckenridge, while the Constitutional Union party, who took a neutral stand, nominated John Bell. Lincoln's victory was an easy one, though he failed to receive a majority of all the votes.

His election was the signal for secession by South Carolina, which had long contemplated the possibility of such a step if the demands of the slavery faction were not heeded. The action was taken in December, and South Carolina was followed by the Gulf States and within a few months by four others. Lincoln was inaugurated March 4, 1861, and in a memorable address he urged the people of all sections to unite in

upholding the Union. He called to his cabinet all his principal rivals in the Chicago convention, and by every means in his power he sought to avert a civil war, which seemed inevitable. His efforts were in vain, however, and on April 14 the war began with the bombardment of Fort Sumter. (The events of that struggle may be more appropriately discussed in the articles, CIVIL WAR IN AMERICA and UNITED STATES, subhead *History*.)

Throughout the war Lincoln displayed the same firmness, sagacity and generosity which he had disclosed in his previous career, and it was largely due to his persistent efforts at recruiting that the Union armies were finally able to put down secession. The most important political event of the whole struggle was doubtless the announcement of the Emancipation Proclamation, the preliminary proclamation being issued September 22, 1862, and the final document, January 1, 1863. Just as the end of the war seemed near, General Lee's great army having surrendered to Grant at Appomattox Court House (April 9), Lincoln was assassinated while attending a performance at Ford's Theater in Washington, the evening of Good Friday, April 14. He died the following morning. The funeral was unparalleled in its solemnity and magnificence, and the mourning was universal. Southern leaders mourned his loss as that of a sincere and magnanimous opponent. European statesmen united in conceding to him all the highest qualities of manhood and statesmanship, while the grief of the people of the North, who had considered him their truest friend—indeed, their savior—was almost too great for expression.

The years since his death have served to raise, rather than to lower, the general estimate of his service to the Union and of the high moral qualities which his character exemplified. Consult biographies by Schurz, Arnold, Tarbell and Nicolay and Hay, and Lowell's *Commemoration Ode*.

Lincoln, BENJAMIN (1733–1810), an American soldier, born at Hingham, Mass. He was elected to the legislature and in 1775 was chosen colonel of a Massachusetts regiment. He was active in organizing the Continental Army in the following year and was present at the Battle of Bunker Hill as major general of Massachusetts troops. He also fought at the Battle of White Plains, and in February, 1777, he was made a major general in the Continental Army, being second in command to General Gates in the Burgoyne campaign. He was wounded October 8 and was crippled for life, but he resumed his

service in August, 1778, assuming command of the Southern army. He was unfortunate in his campaigns, being defeated at Brier Creek and repulsed at Savannah, and was finally compelled to surrender at Charleston, May 12, 1780. He became secretary of war in 1781 and retired three years later. He commanded the Massachusetts militia in Shays's rebellion, and in 1789 he became collector of the port of Boston.

Lind, JENNY (Madame Otto Goldschmidt) (1820–1887), a Swedish soprano, born in Stockholm. She received her musical training under Garcia at Paris, achieved her first success in Berlin in 1845 and subsequently was received with a great ovation in her native city of Stockholm. She made her first appearance in London at Covent Garden in 1847 before an enthusiastic audience and then went to the United States, where she married Herr Goldschmidt in 1851. Returning to Europe, she made an extensive tour, finally settling in England. In later years she seldom came before the public.

Lin'den, a handsome forest tree of Europe. The wood is rather soft and close-grained and is much used by turners. See BASSWOOD.

Lindsay, *lin'zy*, a port and the county-seat of Victoria co., Ontario, Canada. It is on the Grand Trunk railway, 70 miles n. e. of Toronto. Its trade in lumber and grain is extensive, and it is an important railway center. Population in 1911, 6964.

Lindsey, BENJAMIN BARR (1869–), an American judge, best known for his work with boys. He was born in Jackson, Tenn., educated for the law, and since 1901 has been judge of the County Court and Juvenile Court at Denver, Col. He introduced many new features into juvenile court work, specifically the one of putting boys on their honor. He wrote *The Beast and the Jungle* and *Problems of the Children*. See JUVENILE COURT.

Line, a geometric magnitude having but one dimension, length. It is also sometimes regarded as a boundary between two surfaces or as the path of a moving point. A *straight* line does not change its direction between any two of its points. A *curved* line, or *curve*, changes its direction between every two points. A *broken* line is a continuous succession of straight lines in different directions. A *mixed* line is one composed of straight and curved lines. In analytical geometry it is shown that every line may be expressed by an algebraic equation containing two variable quantities, and that every such algebraic equation represents a line. See

COORDINATES; ANALYTICAL GEOMETRY; GEOMETRY.

Lin'en, the name of a fabric made of flax. It is of very ancient use, pieces being in existence which are over four thousand years old. The cloths in which the Egyptian mummies are wrapped give evidence of its early and extensive manufacture in Egypt. The Jews are supposed to have introduced linen manufacture into western Asia, and here the Greeks got their knowledge of it. It was not until the late years of the Republic that the Romans had it in common use, and at that time the priests wore linen garments. In the Middle Ages linen was made extensively in all parts of Europe and especially in Italy, Spain, Flanders and France. The Flemish weavers introduced it into England. The soil of France is especially adapted to the growth of flax, and the linen industry here surpasses that of any other country, though Belgium, Holland and Ireland are close rivals and have very fine products. The United States did not begin to manufacture linen until the eighteenth century and has not developed this industry to a great extent. There is more linen used in the United States in proportion to its population than in any other country.

The flax is reduced to thread, which is spun into yarn for weaving by means of machinery, which is the same as that used for cotton, except for some special adaptations. Linens are superior to cottons in many respects, being smoother, stronger and of brighter luster; they are cleaner and cooler material for summer clothing. They are, however, more expensive. The chief kinds of linen manufactured are lawn, of fine quality; muslin, produced in Ireland; damask, used for tablecloths and the like, and cambric, an exceedingly fine linen fabric. Coarse linen fabrics are sheets, towelings, crashes, duck and canvas. See FLAX.

Ling, a species of sea fish allied to the cod family and measuring from three to four feet in length. The color is gray, shading to olive green, and on the belly, white. It abounds around the British coasts and northern Europe, is caught with hook and line and is preserved in immense quantities in a dried state, under the name of *stockfish*. In the United States the burbot of Lake Ontario is called the ling.

Ling, PEHR HENRIK (1776-1839), a Swedish poet and teacher of gymnastics. Ling was a great traveler through Germany and France, and after teaching fencing at Karlberg he settled in Stockholm and established there a school of

gymnastics. While here he developed a system of exercise which is still used extensively and is known as the *Swedish movement cure*. As a patriotic poet he enjoyed a high reputation, especially from his dramatic works.

Lin'gard, JOHN (1771-1851), an English historian, born at Winchester. He was educated for the priesthood at Douay College, in France. He became a priest, and during the most of his later life he occupied humble positions. Meantime, he wrote and published important historical works, of which the first was *The Antiquity of the Anglo-Saxon Church*. His great life work, however, was *The History of England Until 1688*, which is a scholarly narration of English history, from the standpoint of Catholicism.

Lin'iment, in medicine, an application to be rubbed into the skin for stimulating the tissues and relieving pain. Many official liniments are listed, each having its own peculiar merit, as, for instance, *soap liniment*, used in bruises and sprains.

Linnaea, *lin ee'ah*, a delicate little evergreen, of the honeysuckle family, with creeping stems. It is found in woods and in mountainous places in Scotland and other northern countries, including North America as far south as Maryland. Two beautiful, drooping, fragrant, bell-shaped pink flowers are borne on each flower stalk.

Linnaeus, *lin ee'us*. See LINNÉ, KARL VON.

Linné, *leen nay'*, KARL VON (1707-1778), commonly called *Linnaeus*, a great Swedish botanist, was born at Rashult, Sweden. He showed an early interest in botany, but because of poverty was unable at first to go to school; later, through the assistance of a friend, he entered the University of Lund, where his botanical tastes were encouraged. In 1728 he removed to Upsala, where he undertook the supervision of the botanic garden. Here he made the acquaintance of the botanist Rudbeck, whose assistant he became. Aided by the Academy of Sciences at Upsala, Linné made a journey through Lapland, the result of which was shown in his *Flora Lapponica*. After this he went to the University of Harderwyk, in Holland, and took the degree of M. D. While visiting Leyden he published the first sketch of his *Systems of Nature and Fundamental Botany*. One of his most important works is *Species of Plants*. After traveling in England and Paris, he settled in Stockholm as a physician. He became professor of medicine at Upsala in 1741 and then of botany and natural history. The great merit of Linné as a botanist was that he

arranged plants on a simple system of sexual relationship and prepared the way for the more natural and satisfactory classification which has superseded the Linnaean system. Linné is considered the originator of modern systematic botany and zoölogy.

Lin'net, a small singing bird of the finch family, popular as a cage bird in Europe. It is one of the commonest of British birds and breeds



LINNET

in firs and low bushes. The name linnet is given to a number of different species, one of which, the *redpoll*, is found both in Europe and the United States.

Lino'leum, a preparation of linseed oil with chloride of sulphur, by which it is rendered solid and useful in many ways. When rolled into sheets it is used as a substitute for india rubber or gutta-percha; dissolved, it is used as a varnish for waterproof textile fabrics, table-covers, felt carpets and the like; as a paint it is useful both for iron and wood and for ships' bottoms; as a cement it possesses some of the qualities of glue; vulcanized or rendered hard by heat, it may be carved and polished, like wood, for moldings and knife handles; and mixed with ground cork and pressed upon canvas, it forms floor cloth.

Lin'otype, a typesetting machine in general use in the United States. It casts its own type in solid lines as they are set, and its case carries matrices instead of types. The matrices are brass molds used in casting the type. As the operator fingers the keyboard, which resembles the keyboard of a typewriter, the matrices called for are set in order. When a line has been set, the machine moves it automatically to the casting apparatus, where it is properly spaced, or justified, and the matrices are filled with melted type metal, casting the type into a solid line. This is then automatically set in the stick in its proper place, and the matrices are returned by a lever arm to the case, where by means of an

automatic arrangement they are distributed to their proper channels. Each matrix has a number of nicks on the back, and these are used in distributing. They allow the matrix to fall into its proper channel and prevent it from falling into any other. The operator pays no attention to the casting, the placing of the type in the stick or the distribution of the matrices, the machine performing all of these operations automatically.

The linotype is the invention of Mr. Ottmar Mergenthaler, of Baltimore, who spent over twenty years in completing it. It is a very successful machine and is in general use in the composing rooms of large daily papers. By its use one operator can do the work of about eight men working by hand. By using different cases of matrices, more than one style of type can be set by the same machine. The disadvantage of this machine is that when an error is made, it can be corrected only by recasting the entire line.

Lin'seed Oil, the oil prepared from the seed of the flax plant. The seeds are bruised and ground and then put under great pressure. When expressed without heat, the oil is purer. Linseed oil is used principally in paints and varnishes. It is placed on the market in two forms, *boiled*, or *drying*, oil, and *raw* oil. The boiled oil contains a small quantity of oxide of lead, which causes it to dry quickly. It is the kind used in the manufacture of paints and varnishes. When pure, linseed oil is colorless, but the commercial grade is usually of dark amber hue. Its taste and odor are disagreeable. See **FLAX**; **PAINTS**; **VARNISH**.

Li'num. See **FLAX**.

Linz, *lints*, the capital of Upper Austria, a fortified city, situated on the right bank of the Danube, 98 mi. w. of Vienna. The manufactures consist chiefly of woolen and cotton goods, machinery, hardware, vinegar, liqueurs and tobacco. There is an extensive trade on the Danube. Population in 1910, 67,817.

Li'on, one of the largest and strongest of the cat family, distinguished by its tawny or yellow color, tufted tail and, in the male, full flowing mane. When the male is three years old its mane begins to grow; at six or seven years the lion is full-grown, and at about twenty-two it is feeble and decrepit. The lion is a native of Africa and parts of western and central Asia, where it preys chiefly in the night on live animals, for it avoids carrion, unless nearly famished. It approaches its prey with a stealthy pace, crouches when at a proper distance and springs upon it

Lipan

with fearful velocity and force. The lion's favorite haunts are not in the forests, but in level plains, where herds of antelope graze. The lion's whole frame is muscular, the fore parts extremely so. The large head, flashing eye and heavy mane make the animal so noble in appearance that it is called the *king of beasts*. The voice of the lion is a mighty roar and is probably the loudest call among animals. By nature the lion is somewhat cowardly and disinclined to attack man, but when angered or driven by hunger, it becomes fierce and terrible. Still, it is not nearly so dangerous as the tiger, nor does it have the stealthy, treacherous look which distinguishes the tiger and some other



LION

cats. Unlike most members of the cat family lions are unable to climb trees, but they are very agile in climbing about rocks.

Lipan, *le pah'n'*, formerly a wandering tribe of hostile Athapascan indians, who lived in the southwestern part of the United States. After a period of brave opposition to the settlers, they seem to have disappeared or to have been absorbed by other tribes.

Lip'ari Islands, a group of islands in the Mediterranean, north of Sicily. It comprises the islands, Lipari, the largest; Salina, Vulcano, Filicudi, Stramboli, Panaria and Alicudi. They are of volcanic origin, and two of the islands, Stramboli and Vulcano, have active volcanoes. There are hot springs and pumice stone quarries here. Population in 1911, about 21,000.

Lip'pi, FILIPPO (1406-1469), a Florentine painter. He was a pupil of Masaccio, and his works are noted for their warm, transparent

Liquors

color and expression of human sympathy. He is considered the first representative of the Florentine school of painters, and his greatest works now existing are the frescoes in the Cathedral of Prado, which were executed between 1452 and 1464. These frescoes represent scenes from the lives of John the Baptist and Saint Stephen. Lippi's son, Filippo, usually known as Filippino, inherited his father's talent and continued his work with marked distinction.

Liquid, that kind of matter which, if placed in any gas with which it does not mix, as air, forms a spherical drop; or, if placed in a hollow solid vessel, takes the shape of the vessel, maintaining a constant volume. See MATTER.

Liquid Air. By lowering the temperature of air to 220° below zero F., or 140° below zero C., and subjecting it to a pressure of 585 pounds to the square inch, it can be changed to a liquid. For a number of years physicists attempted to liquefy air, without success, because they could not reduce the temperature to the necessary point; but when this difficulty was overcome, it was found that air could be liquefied more easily than some other gases. The most successful of all experimenters in this line was Mr. C. E. Tripler of New York, who constructed apparatus that enabled him to produce liquid air in large quantities. When exposed in a glass vessel, liquid air absorbs heat rapidly from certain objects and boils violently until it has evaporated. The nitrogen evaporates more rapidly than the oxygen. Notwithstanding its exceedingly low temperature, liquid air can be frozen. It instantly freezes all substances immersed in it. Meat is frozen so hard as to become brittle, and even iron is affected by the temperature. Liquid air is so much colder than ice that when placed in a tin vessel and set upon a cake of ice it boils rapidly. For a time it was supposed that great commercial advantages would be derived from liquid air, but these hopes proved to be without foundation, and now it is regarded only as a curiosity for physical laboratories.

Liq'uidam'bar, a genus of handsome trees, with lobed shining leaves and catkins, or globular heads of flowers. The fragrant liquid resin, called oil of liquidambar and copal balsam, is obtained from the sweet gum, or liquidambar, of Mexico and the United States.

Liquorice, *lik'or is*. See LICORICE.

Liquors, *lik'kuz*. See DISTILLED LIQUORS.

Lisbon, *liz'bun*, (Portuguese, *Lisboa*), the capital and principal seaport of Portugal, on the right bank of the Tagus, about 7 mi. from the ocean. The old town is built in the form of an amphitheater, on a series of hills, and presents a most picturesque appearance, although it has narrow, ill-paved streets. The new part has broad, well-kept streets and open squares. There are in Lisbon several royal palaces, an old Moorish citadel and numerous notable churches and convents. The exports consist chiefly of wine, oil and fruit, and the principal imports are cotton, cotton tissues, sugar, grain, coal, tobacco and coffee. The manufactures are tobacco, cotton, wool, silk, paper and chemicals. Lisbon is a place of remote antiquity, its earliest name being *Olisipo*. In 1755 it was visited by an earthquake, which threw down the greater part of the city and destroyed over 30 000 of its inhabitants. It was taken by the French in 1807, but resisted an attack by Masséna in 1809. Population in 1900, 356,009; in 1910, estimated, 380,000.

Lisle, *leel*. See **LILLE**.

Lis'ter, JOSEPH, Sir (1827–1912), an English surgeon, born at Upton, Essex. From 1860 to 1869 he was professor of surgery in Glasgow University; from 1869 to 1877 he was professor of clinical surgery in the University of Edinburgh, and in the latter year he was appointed to the corresponding chair in King's College, London. His name is especially connected with the successful application of the antiseptic treatment in surgery, which inaugurated a new era in this branch of medical science. He published various papers on surgical pathology. See **SURGERY**.

Liszt, *list*, FRANZ (1811–1886), an eminent pianist and composer, born in Hungary. He made his first public appearance in his ninth year, studied in Vienna and Paris, produced an opera in 1825 and became director of the Court Theater at Weimar in 1849. This gave him opportunity to introduce the music of Wagner, Berlioz, Schumann and other modern writers. In 1861 he went to Rome, where he joined the priesthood. In 1870 he became director of the Conservatory of Music at Pest. His chief works are the *Faust* and *Dante* symphonies and the oratorios, *Saint Elizabeth* and *Christus*; but his fame largely rests upon his ability as a pianist, for he has been unhesitatingly accorded first place among the world's artists in that field.

Lit'any, a solemn supplication to God that he will turn aside his anger. Of the three litanies in the Roman Catholic Church, the "Litany of

the Saints" is the only one having a place in the service books of the Church. The other two are the "Litany of the Name of Jesus" and the "Litany of Loreto." The most common form in the early Church was "Kyrie eleison" (Lord have mercy), given by the priest, to which the congregation responded "Christe eleison." It is reported that this was repeated three hundred times in one procession. The use of the litany in Latin churches is required only on Rogation Days, or the Monday, Tuesday and Wednesday before Ascension Day, and on Saint Mark's Day, April 25. It is common, however, on special occasions, as ordinations and consecrations, and is ordered in time of famine, pestilence, war or like calamities.

Litch'field, **ILL.**, a city in Montgomery co., 45 mi. s. of Springfield, on the Chicago, Burlington & Quincy, the Illinois Central, the Wabash and a number of other railroads. It is in an agricultural region near deposits of oil, coal and natural gas. The leading manufactures are railroad cars, foundry and clay products, glass, engines, flour and lumber. The city has a free library, good schools and public parks. The place was settled in 1853 and became a city six years later. Population in 1910, 5971.

Litchi or **Leechee**, *le'che*, the fruit of a tree, native of southern China. The tree is of a moderate size, with brown bark and large leaves, and the fruit is produced in bunches, which hang from the extremities of the twigs. The berry is red or green, about two inches in diameter, with a tough, thin, leathery coat and a colorless, half-transparent pulp, in the center of which is a single brown seed. The pulp is slightly sweet and pleasing to the taste.

Liter, *le'tur*, the standard measure of capacity in the French or metric system. The liter is a cubic decimeter, that is, it contains about 61.028 English cubic inches. It is equivalent to about one English quart, or, more exactly, to .23 gallons.

Lit'erature, a word often used to mean all the writings of a race or people, no matter upon what subject they may be. In a narrower and better sense, however, only those works which are inspiring and whose reading tends to ennoble and elevate human character should be considered as literature. Under this head come those essays, novels, orations, histories and poems which have proved themselves of greatest worth. This article gives a brief historical view of the subject, and by means of references it suggests a wide range of reading (See **HISTORY**; **ORATION**;

POETRY; PROSE). Every language worthy of a name has its own peculiar literature, which is of greatest delight to its own people and which to a certain extent influences the literatures of other tongues. English literature, for example, is indebted to the Greeks, the Latins, the Italians, the French and the Germans for molding influences. Some of our writers have followed the forms of the Greek and Latin poets; others have been influenced by the more musical Italian, and a third class has shown deference to the classic formality of the French.

ENGLISH LITERATURE. The beginnings of English literature may be said to lie in the songs of the Saxon gleemen, who encouraged their warriors in battle and enlivened their victorious feasts with praise of the heroes (See BEOWULF). There was an early literature of the Celts, light and poetic, filled with delicate sentiment and humor that the Saxon tongue did not show. Very little of it remain, but it exerted a strong influence on our Anglo-Saxon literature. The first poem that really originated in England is Caedmon's *Paraphrase*, a metrical version of parts of the Bible, which was composed about 670 A. D. Because of his numerous translations of Latin into English, the name of "Father of English Prose" has been given to King Alfred, though his prose was by no means the first (See BEDE). The growth of the literature was slow, and it was not until the end of the fourteenth century that the *Vision of Piers Plowman*, the first great poem, was written. At about the same time John Wyclif was translating the Bible into English. Geoffrey Chaucer, the "Father of English Poetry," was born about 1340, and his *Canterbury Tales*, a collection of stories ostensibly told by pilgrims who met at the Tabard Inn and journeyed to Canterbury, are still filled with beauty and charm for the reader who has skill and patience to study them sufficiently to understand the language used by the old poet (See CHAUCER, GEOFFREY). With Chaucer may be said to have closed the age of preparation in literature, for thereafter the development was steady and rapid. After the introduction of printing in the fifteenth century books multiplied with great rapidity (See CAXTON, WILLIAM); but nevertheless, it was not until the time of Queen Elizabeth, in the latter half of the sixteenth century, that English literature took the position of first importance in the world. Then, awakened as the nation was by the wonderful discoveries and explorations in America, by scientific discoveries and by the

great victories of the navy, England produced a company of writers the equals of whom have scarcely been seen (See BACON, FRANCIS; SPENSER, EDMUND; JONSON, BEN; SHAKESPEARE, WILLIAM). Thoughtful essays, filled with the new science and sparkling with the wit of the day; poetry, glowing with the love of nature and splendid with beautiful phrases, and marvelous dramas, never since equaled, were poured out in those fifty resplendent years. The period is said to close with the accession of James I in 1603.

During the Puritan Age, which closed in 1660, England changed her literary style completely and sacrificed her love of the beautiful to her search for truth. Milton, the one great literary man of his age, shows in his poetry the changes that were taking place, for he began his long literary career under the first Charles and did not complete his greatest poem till, old and blind, he lived alone after the Revolution had done its work (See MILTON, JOHN). With the restoration of Charles II, the literature of England quickly responded to French influences and rapidly developed into the striking brilliancy and beauty of the age of Queen Anne (1702-1714) (See DRYDEN, JOHN; ROBINSON CRUSOE; SWIFT, JONATHAN; ADDISON, JOSEPH; POPE, ALEXANDER). It was during this time that *The Spectator*, the first newspaper, vastly different in form from those of the present day, made its appearance. In the latter part of the eighteenth century were to be seen the beginnings of the modern period, the chief characteristics of which were the perfection of oratory and the rise and growth of the novel (See BURKE, EDMUND; RICHARDSON, SAMUEL; FIELDING, HENRY; GOLDSMITH, OLIVER). A revival of interest in nature brought the poets away from the strict rules that had made their work cold and dead and filled it with new life and vigor (See COLERIDGE, SAMUEL TAYLOR; WORDSWORTH, WILLIAM; BURNS, ROBERT; LAMB, CHARLES; SCOTT, WALTER, SIR; BYRON, GEORGE GORDON NOEL; KEATS, JOHN; SHELLEY, PERCY BYSSHE). The impetus given to true art by these great men was continued by the writers of the Victorian Age, who placed English literature at the summit of excellence (See CARLYLE, THOMAS; BROWNING, ELIZABETH BARRETT; MACAULAY, THOMAS BABINGTON; TENNYSON, ALFRED; DICKENS, CHARLES; BROWNING, ROBERT; ELIOT, GEORGE; THACKERAY, WILLIAM MAKEPEACE).

AMERICAN LITERATURE. In early colonial days there was little that could be called really

American in the writings of the literary men of this country, but, beginning with the excellent prose of Franklin's *Autobiography*, a new life appeared, though it was not until the early part of the nineteenth century that poetry, essays and fiction of a characteristic American type became common (See IRVING, WASHINGTON; COOPER, JAMES FENIMORE; BRYANT, WILLIAM CULLEN; POE, EDGAR ALLEN; PRESCOTT, WILLIAM HICKLING). Before, during and after the Civil War lived a remarkable group of poets, essayists and novelists, the greatest this country has ever known. Most of them resided in and around Boston and were deeply moved by new ideas in religion and by the slavery agitation that was then at its height. These greatest poets, greatest essayists, greatest writers of fiction, greatest historians, placed this epoch on a level with the highest period in England, if we except possibly the age of Shakespeare. To find what was really accomplished, reference should be made to the articles on EMERSON, RALPH WALDO; HAWTHORNE, NATHANIEL; LONGFELLOW, HENRY WADSWORTH; WHITTIER, JOHN GREENLEAF; HOLMES, OLIVER WENDELL; LOWELL, JAMES RUSSELL; PARKMAN, FRANCIS; BANCROFT, GEORGE; MOTLEY, JOHN LOTHROP. Since the Civil War a host of writers in both prose and poetry have kept the level high, and there are now many artists whose graceful writings give the keenest pleasure to thousands of readers (See HOWELLS, WILLIAM DEAN; JAMES, HENRY; CLEMENS, SAMUEL LANGHORNE; MITCHELL, S. WEIR; HARRIS, JOEL CHANDLER; FREEMAN, MARY E. WILKINS).

GREEK LITERATURE. The literature of the Greeks has served as a model and inspiration to writers of every age and race. Its poetry is musical and finished, its essays are refined, thoughtful and polished, and its oratory is noble and eloquent. Its great epic, the *Iliad*, is still studied in every school where the language is taught and still has its influence on the writers of to-day. It is a storehouse of allusions which are in constant use, and without a knowledge of it reading becomes difficult (See HOMER; *ILIAD*; *ODYSSEY*). Greek lyric poetry was connected with, in fact was almost a part of, their music. The Greeks employed a great variety of meter and developed many forms of poetry that are still imitated (See SAPPHO; ANACREON; PINDAR). Their historians were numerous, and to them we are indebted for much of our knowledge of the earlier peoples (See HERODOTUS; THUCYDIDES; XENOPHON). In philosophy Greece had no rivals,

and in one way and another her great men foreshadowed most that has been perfected in our times (See SOCRATES; PLATO; ARISTOTLE). Her orations were among the greatest ever delivered, and if we consider their effect upon the people, they must be called the greatest. In their modern form they have served as models for many an orator (See DEMOSTHENES). But the greatest triumph of Grecian literature, if we except the *Iliad*, lay in her dramas. Both tragedy and comedy had their origin in Greece in the worship of the god Bacchus, and for beauty, strength and passion, the productions of the old Athenians still rank among the greatest in the world (See ARISTOPHANES; AESCHYLUS; SOPHOCLES; EURIPIDES; THEATER; DRAMA).

LATIN LITERATURE. Scarcely behind the Greeks were the Romans, though the latter were in a sense imitators and really originated few things. Both their prose and poetry, however, have influenced the literature of modern Europe more forcibly than that of Greece and have entered more deeply into the education of mankind than those of any other nation. There was a period of crude beginnings, in which the language was taking form. During this time little was produced that has remained alive. Following this came a period of improvement, which lasted to about 84 B. C., during which time there were many great literary names in Rome, chief of which was Cato. From 84 B. C. to 14 A. D. is usually known as the Golden Age (See VERGIL; *AENEID*; CAESAR, CAIUS JULIUS; CICERO, MARCUS TULLIUS; LIVY). From the death of Augustus to the time of Hadrian is often called the Silver Age (See JUVENAL, DECIMUS JUNIUS JUVENALIS; TACITUS, PUBLIUS CORNELIUS; PLINY, CAIUS PLINIUS SECUNDUS). From then till the fourth century there was a falling off in literary power, and after the fourth century there was a distinct decline that finally resulted in the extinction of Latin as a living language.

ITALIAN LITERATURE. For Italy the fourteenth century was the most brilliant period, although it was the first in which the modern Italian tongue was used. Latin still remained the scholarly language, but a trio of great writers used the language of the people, and the beautiful poems and perfect prose produced by these men made Italy for a time the most prominent literary nation in Europe (See DANTE ALIGHIERI; PETRARCH, FRANCESCO; BOCCACCIO, GIOVANNI). By the latter part of the sixteenth century other nations had taken the lead, and thereafter the influence of Italy became of less and less impor-



CONTEMPORANEOUS WRITERS

1. F. Hopkinson Smith.
2. Helen Hunt Jackson.
3. Joel Chandler Harris.

4. Selma Lagerlof.
5. Count Lyoff Tolstoi.
6. Mary E. Wilkins Freeman.

7. William Allen White
8. Julia Ward Howe.
9. Ralph Connor.

tance, only a few writers deserving a world-wide recognition (See ARIOSTO, LUDOVICO; TASSO, TORQUATO). It must be remembered, however, that Italy gave the sonnet to poetry, and that the imagery, metrical forms and materials for plots in both drama and story used by such writers as Chaucer, Spenser and Shakespeare came directly from the Italians or were the fruitful result of their art.

FRENCH LITERATURE. It was not until the sixteenth century that France was moved by the awakening spirit that had caught the souls of the English, but then little tales and polished essays were produced in great number, as the characteristic feature of the age (See RABELAIS, FRANÇOIS; MONTAIGNE, MICHEL). The Golden Age of the French appeared at the end of the seventeenth century, the epoch of Louis XIV. Then her art really dominated Europe, though the full effect of her influence was not felt until some time later. Dramatists, essayists, wits and poets all are represented among her men of genius (See CORNEILLE, PIERRE; RACINE, JEAN; MOLIÈRE; LAFONTAINE, JEAN DE; FENELON, FRANÇOIS DE SALIGNAC). The eighteenth century produced many brilliant men and established France firmly in the high position she to-day occupies. Among her writers of that time are Montesquieu, Voltaire and Rousseau. Of later writers she has many in every field of literature (See HUGO, VICTOR; DUMAS, ALEXANDER; BALSAC, HONORÉ DE; GUIZOT, FRANÇOIS; LAMARTINE, ALPHONSE MARIE).

GERMAN LITERATURE. The literature of Germany did not become of world-wide importance until modern times, though her poems and tales date back beyond Charlemagne (See NIBELUNGENLIED; MINNESINGERS). In modern times, however, the profound scholarship of the Germans has made them leaders in almost every domain of thought, and the names of their great writers are made household words through admirable translations (See LESSING, GOTTHOLD; GOETHE, JOHANN WOLFGANG VON; SCHILLER, JOHANN FRIEDRICH CHRISTOPH VON; KANT, IMMANUEL; HUMBOLDT, FRIEDRICH HEINRICH VON; HEGEL, GEORG WILHELM FRIEDRICH; RICHTER, JEAN PAUL FRIEDRICH).

Other nations than those mentioned have their literature, and some have produced books that have profoundly affected the drift of modern thought. The Hebrew Bible is doubtless the one book to which the literature of the world is most indebted, both as an inspiration and a model. Some of the leading articles to which

the reader is referred for a further acquaintance with the literature of nations not mentioned above are CONFUCIUS; SANSKRIT; VEDAS; AVESTA; TALMUD; BIBLE; APOCRYPHA; ARABIAN NIGHTS; KALEVALA; EDDA; SAGAS; MAHABHARATA. See READING.

Mention of the special literature of the countries not given here may be found under the names of those countries.

Lith'ium, a metallic element of silver-white luster, that quickly tarnishes in the air. Although lithium may be cut with a knife, it is scarcely as soft as potassium of soda. It fuses at 180° C. and takes fire at a slightly higher temperature. Lithium, which is the lightest of all known solid bodies, floats upon rock oil. It is distributed very widely, but always in small quantities. It forms salts similar to those of potassium and sodium, and these are used extensively in medicine. Effervescing lithium water is sometimes used in place of soda or potash water. The citrate of lithia, whose properties are similar to those of the carbonate, is also used by physicians. On account of the splendid red color they impart to flame, some of the lithium compounds are used in the manufacture of fireworks.

Lithography, *lith og'ra fy*, the art of printing from specially prepared stones. The stone used is a fine-grained limestone of light gray color and is generally known as *lithograph stone*. That of the best quality is obtained in Bavaria, where most of the world's supply is secured.

Lithography is based on the principle that grease and water will not mix, and the preparation of the stone consists in so treating the surface that the portion containing the drawing will retain ink, while the remaining portion will not. The stones are cut into slabs 4 inches thick and varying in size from 6 by 8 inches to 44 by 62 inches. The surface of the stone is ground to a grain resembling that of fine drawing paper or polished with pumice stone, according to the style of print to be made. If the picture is to be drawn with a crayon, the ground surface is used, but if it is to be worked on with a pen, the polished surface is required.

After the stone is prepared, the picture is drawn upon it with a lithograph crayon, just as it appears in the copy, except that it is reversed, like the face of a type. The drawing is then washed with a solution of gum arabic and nitrate of soda, to keep the grease from spreading and to render the other portions of the surface more porous and more capable of absorbing water. After the coating of acid and gum is dried, the

Lithography

stone is washed with water, then with turpentine, which removes all traces of the drawing except the grease from the crayon. The turpentine is then removed by washing with water, and the stone is ready for use. When the picture is engraved on the stone, the work is done in a manner similar to that of engraving steel or copper. See ENGRAVING.

In printing, the stone is first wet with a sponge. The water does not stick to the greased portion constituting the picture, so that part of the surface remains dry while the other is wet. When ink is applied the process is reversed. The ink sticks to the greased surface in such a way as exactly to reproduce the drawing when the paper is pressed upon it, while it leaves the wet surface clean. The printing is done in a cylinder press especially prepared for this work, and transfer plates, made by transferring the picture from the stone to a metal plate, are usually employed. By this means a number of pictures can be impressed upon the same plate, so that by using a large sheet of paper several pictures are produced at each revolution of the press.

COLOR LITHOGRAPHY. This is the process of producing lithograph pictures in the natural colors of the object and differs from ordinary lithography only in the elaboration of the process. First, a good plate or stone is made, which contains the complete outline of the picture. This plate contains registering marks on each of its margins, and all of the other plates must be made to register accurately with it. Each color requires a special plate, and the final effect is produced by printing in the right order the different colors required. This order is usually yellow, red, brown, or gray, blue and then the tints of any other colors necessary. The color plates in this encyclopedia are produced by color lithography.

PHOTO-LITHOGRAPHY. This is a combination of photography and lithography, now in quite general use. By this process the outline of the picture is photographed on a sensitive film, which is placed on the surface of the stone. This is used in producing the outline of the picture (See PHOTOGRAPHY). From this outline the stone is prepared and the printing is done in the same manner as in ordinary lithography.

Lithography reproduces art work of a high order of excellence and is often employed to reproduce in an inexpensive way paintings and other works of the old masters. It is also very generally used in the production of colored pic-

Little Falls

tures and for engraving letter heads and illustrations used in high class advertisements.

Lithotomy, in surgery, the operation for the removal of stone from the bladder. When properly performed, the operation seldom requires more than three minutes, and in favorable cases the wound heals in the course of a month. See CALCULUS.

Lithuania, a region in eastern Europe, which formed a grand duchy in the eleventh century, became united to Poland in the fourteenth century and at the dismemberment of that kingdom was nearly all appropriated by Russia. The balance went to Prussia. The Lithuanians are fair-haired, blue-eyed and light-skinned; they are of mild disposition and are chiefly occupied in agriculture. Their language is akin to the Old Prussian and forms, with these, the Lithuanian, or Lettic, branch of the Aryan family of tongues. Their literature consists chiefly of popular songs and hymns, religious works and tales.

Litmus, a peculiar coloring matter, procured from lichens. Paper tinged blue by litmus is reddened by the feeblest acids and hence is used as a test for the presence of acids. Litmus paper which has been reddened by an acid will be turned blue again by an alkali. Hence the paper is indispensable in chemical laboratories, especially in all analyses.

Little Falls, MINN., the county-seat of Morrison co., 96 mi. n. w. of Minneapolis, on the Mississippi River and on the Northern Pacific railroad. The city is an important commercial center for a large agricultural and lumbering district. A dam across the river affords good water power and there are extensive manufactures of lumber, paper, flour, beer, agricultural implements and brick. The city has a fine courthouse, a public library, Saint Gabriel's Hospital, Saint Otto's Orphan Asylum and several good school buildings. Population in 1910, 6078.

Little Falls, N. Y., a city in Herkimer co., 21 mi. s. e. of Utica, on the Mohawk River and the Erie Canal and on the New York Central, the West Shore and other railroads. It is in a grazing region, and exports considerable dairy products. The river here flows through a rocky defile over many little falls and affords good water power for extensive manufactures. These include knit goods, paper, carriages, bicycles, leather, machinery, foundry and creamery products and other articles. The city has a public library, an excellent high school, a city

hospital and many fine church buildings. The place was settled about 1770. The settlement was destroyed by indians and Tories in 1782, but was rebuilt by a colony of Germans eight years later. It became a city in 1895. Population in 1910, 12,273.

Little Rock, ARK., the capital of the state and the county-seat of Pulaski co., situated in the geographical center of the state, about 130 mi. s. w. of Memphis, Tenn., on the Arkansas River and on the Chicago, Rock Island & Pacific, the Saint Louis Southwestern and two lines of the Saint Louis, Iron Mountain & Southern railroads. The city is built on a rocky bluff about 50 feet above the river. The new capitol is the most prominent building, and there are, besides this, the Federal buildings, a state arsenal and penitentiary, the county courthouse and various other fine buildings. The city contains the Marquand, supreme court, state and collegiate libraries. Among the educational institutions are the Philander Smith College, Arkansas Baptist College, Maddox Seminary, the Arkansas Military and other academies and state schools for the blind and deaf. The charitable institutions include a Confederate soldiers' home, a state asylum for the insane, the Saint Vincent's Infirmary, Jane Kellogg Home and the Methodist Orphanage. There are more than 70 churches, the most prominent of which are the Saint Andrews Cathedral and Christ Church.

Cotton is the principal agricultural product, and fruit growing, truck farming and coal mining are also carried on. There are various industrial establishments, including cottonseed oil mills, foundries and railroad shops, granite quarries, flour mills, brick and tile works and other manufactories. The place was settled in 1814 and was known as Little Rock, in contrast to Big Rock, one mile above the city, which is now the site of Fort Logan H. Roots. It was made the seat of the territorial government in 1820, was incorporated as a town five years later and was chartered in 1835. The place was captured by a Union army under General Steele, Sept. 10, 1863, but was held by the Confederates during most of the period covered by the Civil War. Since about 1880 the growth has been constant and rapid. Population in 1910, 45,941.

Liturgy, *lit'ur jī*, the form of worship in the celebration of the Lord's Supper, which is in general the same in all churches. The first part of the service consists of Scripture reading,

sermon and prayers; the second, of prayers and the offering of the consecrated bread and wine. The Book of Common Prayer contains the form of communion service used in the churches of the Anglican communion. The liturgies of the Eastern churches have been named the *Syrian rite*, still used by the Maronite Church of Mount Lebanon, in a Syriac version; the *Persian rite*, now used by the Nestorians; the *Byzantine rite*, used in many parts of the world and by the Greek and Russian churches; the *Egyptian rite*, a version of which is used by the Copts. The Western liturgies are the Roman mass, called the Latin liturgy, and that of Protestant churches, known as the vernacular, which grew out of the Reformation.

Liu-Chiu, Lu-Chu, Liu-Kiu, *lyoo kyoo*. See LOO-CHOO.

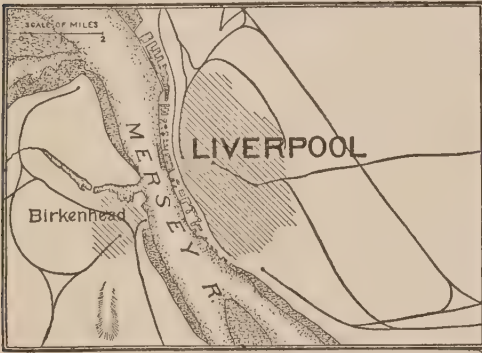
Live'-forever. See HOUSELEEK.

Liv'er, the gland which secretes bile. In man, the liver is situated just below the diaphragm, on the right side, extending across the middle line of the body toward the left. From its position it is liable to compression and injury. In its general form the liver is flat, broad and thick toward the right side, becoming narrow and thin toward the left. Its upper surface is convex or arched and fits into the concave surface of the diaphragm, while its lower surface is irregularly divided into lobes, five in number, separated by clefts, or fissures. In texture it is soft and easily crumbled. Its color is a dark reddish brown. The liver is supplied with blood by the hepatic artery. The portal vein carries to it the venous blood from the intestines, spleen and stomach, and after this blood circulates through the cells of the liver it is carried by the hepatic veins to the inferior vena cava. The bile secreted in the liver is carried by the hepatic duct to the gall bladder, a little pear-shaped sac on the under side of the liver, where it is stored when digestion is not going on; during digestion it is poured directly into the duodenum. See BILE; DIGESTION.

Liv'ermore, MARY ASHTON RICE (1821-1905), an American reformer, born in Boston. She early was active in the anti-slavery and temperance reform movements and during the Civil War gained special fame by her unselfish relief service for the Union soldiers. After the war she lectured upon moral and social problems, being a powerful advocate of temperance and woman suffrage. She was at one time editor of the *Woman's Journal* of Boston and was the author of numerous books.

Liverpool

Liverpool, the second city and seaport of England and the third city of the United Kingdom, situated on the river Mersey, 3 mi. from its mouth, 31½ mi. s. e. of Manchester and 201 mi. n. w. of London. The city is built on a bend in the river, which gives it a semicircular water front between six and seven miles in extent. From this level the land rises gradually to an altitude of 250 feet. The main streets lead from the water front to different parts of the city. The newer and better part of the town is on the highland back from the river. Here are located some of the finest public buildings in the



world. Chief among these is Saint George's Hall, constructed from the profits arising from the docks, and used for various purposes. It contains a large audience room, which has one of the largest organs in the world; it also has other apartments used for public gatherings and educational purposes. Around this building or near by are located the free library, the Walker Fine Art Gallery and the Picton Lecture Hall, with a large reference library. The city maintains a large number of hospitals and other charitable institutions, designed to meet all the wants of its inhabitants. Nearly all of the public utilities, such as waterworks, lights, tramways or street cars, are owned and operated by the municipality.

Liverpool has a more extensive foreign commerce than any other port in the United Kingdom, and the docks, which extend along the river for nearly seven miles and contain over twenty-four miles of wharfage, are the chief objects of interest. Near the center of the line of docks is an immense floating dock, supported on pontoon boats. This is 2060 feet long and is connected with the mainland by eight bridges. Here most of the passenger steamers land. The docks have been constructed at great expense and include basins

Livingston

which are enclosed by gates, so that vessels loading or unloading are not affected by the change of tide. Nearly all of the cotton, grain, dressed meat and other produce shipped from Australia, Canada and the United States to England enter through the port of Liverpool; likewise most of the exports from the United Kingdom to these countries leave from this port. Population in 1911, 746,566.

Liverworts, *liv'ur wurts*, a group of plants forming one of the two suborders of the *bryophytes*, the other including the mosses. Liverworts grow in various places, though they are commonly found in moist regions. One of the most common liverworts is the *marchantia*, which is always found in damp places. The species of another group live upon rocks and tree trunks and are often confused with delicate mosses, which they closely resemble.

Livingston, MONT., the county-seat of Park co., 123 mi. s. e. of Helena and about 45 mi. n. of the Yellowstone Park, on the Yellowstone River and on the Northern Pacific and the Chicago, Burlington & Quincy railroads. The city is in a mining and lumbering section. It is a division headquarters of the Northern Pacific and has railroad shops and roundhouses. There are also lumber mills, lime works and an important trade in live stock, wool, mining tools, gold, coal and coke. The railroad passenger station is a fine building. Population in 1910, 5359.

Livingston, EDWARD (1764-1836), an American statesman, born in Clermont, N. Y. He graduated at Princeton in 1781, studied law, was admitted to the bar and soon attained eminence in his profession. He was sent to Congress from New York in 1794, serving until 1801. Later he became mayor of the city of New York, but through the dishonesty of others a shortage in his accounts developed; he resigned and went to the newly acquired Territory of Louisiana, where he built up a large practice. He was partly responsible for the law code adopted in the state in 1821, and he later prepared an elaborate code of criminal law, which has been adopted in part by many states and foreign countries. He served in Congress from 1822 to 1829, and was then elected United States senator. In 1831 he was secretary of state and in 1833 was minister to France, where he settled the claims of American citizens against France for depredations against American commerce.

Livingston, ROBERT R. (1746-1813), an American statesman, born in New York City, educated at King's College (now Columbia) and

admitted to the bar. He was appointed to a position in New York City under the British government, but lost his office through his radical patriotism, and was thereupon elected to the Continental Congress, where he was one of the committee appointed to draft the Declaration of Independence. Before the instrument was signed, however, he returned to New York State, where he assisted in drawing up a state constitution. He became chancellor under that constitution, holding the office until 1801. In that capacity he administered the oath of office to Washington as president. From 1781 to 1785 he had charge of the foreign relations of the Confederation and he was active in his support of the Federal Constitution in New York State. He was minister to France in 1801 and with James Monroe negotiated the purchase of Louisiana.

Livingstone, DAVID (1813-1873), a missionary and African traveler, born at Blantyre, in



DAVID LIVINGSTONE

Scotland. Under the auspices of the London Missionary Society he went in 1840 as medical missionary to South Africa, where he joined Robert Moffat. His first station was in the Bechuana territory, and here his labors were associated for nine years with Moffat, whose daughter he married. Having learned from the natives that there was a large lake north of the Kalahari Desert, he explored the region and discovered Lake Ngami. Three years later, in

1852, he undertook another expedition, exploring the upper lakes of the Zambezi River and arriving at Loanda, on the Atlantic coast, in 1854. Returning to Linyanti, he struck eastward from there in 1855, tracing the Zambezi to the Indian Ocean and thus crossing the entire continent. The record of this journey is found in his *Missionary Travels and Researches in South Africa*, published in London in 1857. In 1858 he was placed in command of an expedition for the exploration of eastern and central Africa, and during this expedition he discovered lakes Shirwa and Nyassa. Seven years later he started out to set at rest the question of the sources of the Nile, and from this time until his death he was engaged in laborious explorations in the lake region of South Africa, especially to the westward of Nyassa and Tanganyika, where he discovered lakes Moero and Bangweolo. For about three years no communication from him reached the outer world, and doubts regarding his safety were set at rest only when it was known that Henry M. Stanley, the correspondent of the *New York Herald*, had seen and assisted him at Ujiji, on Lake Tanganyika. They parted in March, 1872, Livingstone going to explore the southern end of Lake Tanganyika and Stanley proceeding to Zanzibar. Another year's hardships completely exhausted Livingstone, and he died in May, 1873, near Lake Bangweolo. His body was taken to England and was buried in Westminster Abbey. He was the author of *Missionary Travels and Researches in South Africa* and *The Zambezi and Its Tributaries*. Consult Stanley's *How I Found Livingstone* and Hughes's *David Livingstone*.

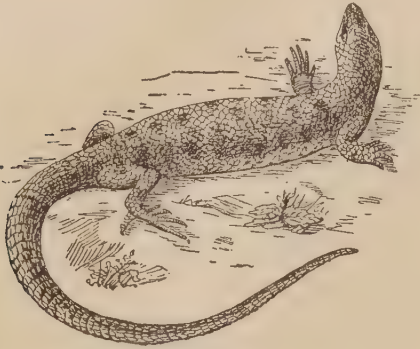
Livo'nia, GULF OF. See RIGA, GULF OF.

Livre, le'vr', an old French coin about equal in value to the franc, which superseded it in 1795. The livre was also an ancient unit of weight, equal to about 17½ ounces avoirdupois.

Liv'y (59 B. C.-17 A. D.), Titus Livius, a celebrated Roman historian. Nothing is known of his life except that he was born at Patavium (Padua), that he came to Rome, secured the favor of Augustus and became a person of some consequence at court; that he was married and had at least two children, and that he died in his native town. His history of Rome consisted of 140 or 142 books, of which we have only thirty-five. Of all the books except two, however, we possess short epitomes or tables of contents. Livy makes no pretensions to the character of a critical historian; his purpose was to glorify his country.

Lizard

Liz'ard is the popular English name of numerous reptiles, which have usually two pairs of limbs and a long body terminating in a tail.



LIZARD

The lizards number about two thousand species and accommodate themselves to all conditions except cold. In the tropics they are numerous and large. Some lizards feed on vegetables, but for the most part they live upon small birds and insects. Lizards lay their eggs in the sand and abandon them. The chief families of lizards are the skinks, the geckos, the iguanas and the chameleons. Poison glands are wanting in all lizards excepting in the Gila monster of Arizona and Mexico, which is capable of inflicting a dangerous bite. See **BASILISK**; **GILA MONSTER**; **HORNED TOAD**; **MONITOR**.

Llama, *lah'ma*, a cud-chewing animal, found in South America and closely allied to the camel. The llama has the general appearance of a long-necked sheep, standing about three feet at the shoulder. Of the four known species, the guanaco and the vicuña are found in a wild condition, while the llama and the alpaca have long been domesticated. The llama can travel about fourteen miles a day across the mountain passes.

Llanos, *lah'noze*, the Spanish name given to the vast plains situated in the northern part of South America, particularly in Columbia and the basin of the Orinoco. During the dry season the vegetation is burned up by the sun, while in the rainy period the llanos are flooded with water. Between these two seasons they are covered with thick grass and are ranged by vast herds of cattle and horses. Farther south, such plains are called *pampas*, and in North America *savannas*. See **PLAIN**.

Lloyd-George, **DAVID** (1863–), a British statesman, whose name will always be associated with the reform of land taxation in Great Britain.

Loam

He was the son of a Welsh school teacher whose early death left his family in reduced circumstances. Through the generosity of an uncle Lloyd-George was trained as a lawyer. From the beginning of his practice he found time to take an interest in politics, and in 1890 he was elected to the house of Commons, in which he has since served continuously. He soon became the recognized leader of the Welsh party and of the radicals, and in 1905 his power was recognized by his appointment as president of the board of trade in the Campbell-Bannerman ministry. In 1908, when Asquith became prime minister, Lloyd-George became chancellor of the exchequer. In 1915 he was made Minister of Munitions, and directed his energy towards supplying the army with arms and ammunition. In December, 1916, he succeeded Mr. Asquith as premier. See **WAR OF THE NATIONS**.



LLAMA

Lloyds, the world's most famous marine insurance association, whose headquarters are in the Royal Exchange at London. It derived its name from Lloyd's Coffee House, where the members were at first accustomed to meet. Members are admitted by subscription, and the affairs of the association are conducted through an executive committee. It has agents in all important ocean ports of the world, and it issues daily reports at the society's headquarters, containing information about shipping. An annual publication, *Lloyd's Register*, is also compiled.

Loam, *lome*, a soil compounded chiefly of sand, clay, carbonate of lime or chalk and decayed vegetable and animal matter. See **SOIL**.



DAVID LLOYD GEORGE
Chosen Premier of Great Britain, December, 1916

Lobe'lia, an extensive genus of beautiful herbs, which are natives of almost all parts of the world and especially of the warmer portions of America. Several species grow wild in the United States. The most brilliant of these is the cardinal flower that forms so conspicuous a feature in the autumn swamps. A large, blue-flowered variety is almost as brilliant. Many tropical species are cultivated in hothouses because of their great beauty. All of the plants are more or less poisonous when eaten.

Lob'lolly Bay, the popular name of an elegant ornamental evergreen tree, common along the seashore of the southern United States. It has large and showy white flowers and grows to the height of fifty or sixty feet.

Loblolly Pine, an American pine, next to the white pine the loftiest in North America. Its leaves are six inches long, united in threes or fours. Its timber is of little value.

Lob'ster, the largest of the crustaceans, an animal very closely related to the common crawfish (see CRUSTACEA). The body has seven distinct segments, while the other thirteen, which form the thorax and head, are so blended together as not to be easily distinguished. The animal has two pairs of antennae and six pairs of mouth organs. The first pair of legs is long and terminates in large claws, one of which is thick and very heavy and is used for crushing objects. The other claw is shorter, smaller, more or less curved, toothed and pointed at the tip. It is borne on the large claw and so arranged that it can be used in fighting or to seize its prey.

The tail is composed of the last segment and has two wide appendages on each side, making a broad incurved organ, which the animal uses in swimming. By straightening this tail and drawing it forcibly under, the lobster is thrown backward through the water at a rapid rate. The lobster has two large, compound eyes, situated at the end of thick stocks. Its sense of smell is keen, as is its sense of hearing. The female carries her eggs on the under side of the abdomen until they hatch, when the young are driven away and for a time swim about freely near the surface. After about a month they descend to the bottom, where they remain. The



LOBSTER'S HEAD
Right gill covering removed to
show the gills

lobster lives on the bottom of the sea and rarely rises more than a few feet from it. It walks about on the tips of its legs, extending the large claws forward and pushing itself along by the swimming feet.

Lobsters are highly esteemed for food. They are caught in *pots*, which are traps made of wood, sunk among the rocks in the clear water in which the animals live. The pots have a funnel-shaped opening and are baited with fresh meat, which attracts the lobsters. When they have once entered the trap they are unable to escape. When taken from the water the lobster has a greenish appearance. The brilliant red color of those placed upon the market is produced by boiling.

Lob'worm, a worm with a round head and a body about the size of a large earthworm. It breathes through thirteen pairs of gill-tufts. The lobworm, or lugworm, is used for bait in deep sea fishing, and at low tide it may be found on every seabeach by the little coils of sand it leaves when burrowing.

Lo'cal Option, a term applied to the principle by which a certain majority of the inhabitants or taxpayers of a certain locality may decide as to whether liquor may be sold therein. This principle operates in several of the states of the Union and is being rapidly extended through the agitation of temperance organizations. See LICENSE.

Loch Lomond, *loK lo'mond*. See LOMOND, LOCH.

Lock, an arrangement for fastening doors, chests, drawers and the like. It is so made that it cannot be worked except by the key or knob especially fitted to it. The simplest lock contains a bolt, a staple into which the bolt locks, and a spring which prevents the bolt from being moved without the key. The bolt has a rounded notch on the under side, into which the key fits. On the upper side are two square notches, *CC*, which are as far apart as the bolt moves. Back of the bolt and fastened to the frame by a pivot, is a tumbler, indicated by the dotted lines in Fig. 1. On the end of the tumbler is a square piece of metal, *E*, which drops into the notches, *CC*, as the bolt is locked or unlocked. This plug is pressed down upon the bolt by a spring attached to the frame and the other side of the bolt. The

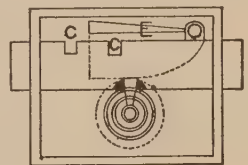


FIG. 1

whole arrangement is enclosed in an iron frame. On the inside of the frame are curved ridges, called *wards*. Slots are cut into the key so as exactly to fit these wards, and by this arrangement each lock is protected so that it cannot be opened or closed by any key but the one made specially for it. In Fig. 2 is shown a lock with a

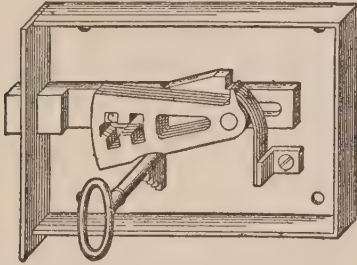


FIG. 2

number of tumblers, which make it more complicated and more difficult to be opened with any key except its own. Formerly locks of this pattern were in general use on stores and other public buildings, but they have now been almost entirely replaced by the Yale lock, named from its inventor, Linus Yale. This has a flat key with notches on one edge, which fit a number of pin tumblers that move up and down. It is practically impossible to open this lock with any key except the one designed for it.

Lock, in engineering, a device in a canal for raising or lowering boats from one level to another. A lock is a chamber whose side walls are made of stone or concrete and whose ends are closed by a pair of folding gates. The gates in each pair are called *leaves*. Each leaf turns on an upright post, called the *quoin* post. When closed, the leaves form a V-shaped partition across the chamber, with the vertex pointing up stream. This enables the gates to withstand the pressure of the water in the lock. When a boat is to be locked from a lower to a higher level, the gates at the upper end of the chamber are closed and those at the lower end are opened. This leaves the water in the chamber at the same level as that in the lower level of the canal. The boat passes into the chamber, and the lower gates are closed. By means of valves in the gates at the upper end or in the sides or bottom of the chamber, the water is gradually let into the lock until the boat is raised to the upper level of the canal. The gates at the upper end of the lock are then opened and the boat passes out. When the boat is lowered, the operations are reversed. In

large locks the gates and valves are operated by machinery. See CANAL.

Locke, DAVID ROSS (1833-1888), an American journalist and humorist, born in New York State. He learned the printer's trade and was connected with several newspapers. He became famous for his political satires, published under the name of Petroleum Vesuvius Nasby.

Locke, JOHN (1632-1704), one of the most influential of English philosophers, born at Wrington, in Somersetshire. He was educated at Westminster School and Christ Church College, Oxford, after which he applied himself to the study of medicine. Later he became secretary to the earl of Shaftesbury and was assigned the task of drawing up a constitution for the Carolinas, of which the earl was one of the proprietors. His attempt, known as the Grand Model, was a failure, because it was based upon a feudal aristocracy, which was wholly impracticable in a new country. Later he published his *Essay Concerning Human Understanding*, a work which attracted wide attention and at once gave him a place among the foremost thinkers of his time.

Locke's essay is essentially an inquiry into the nature and limits of human thought processes. He maintains that there are no innate ideas and that at birth the mind is as a tablet of blank white paper (*tabula rasa*), whereon experience is to write ideas. He asserts that all experience can be resolved into sensation and reflection, that is, into the impressions that external objects make upon the mind through the avenues of the senses and the perceptions of the operations of the mind in disposing of sensations, and therefore external objects and reflection upon mental processes, such as reasoning, willing, believing and other similar operations, constitute the sources of all knowledge. These views were revolutionizing in their tendency and profoundly affected the educational thought of the time. Besides his essay on the understanding, Locke's other important works are *Of Civil Government*, *Reasonableness of Christianity* and *Thoughts Concerning Education*.

Lockhart, JOHN GIBSON (1794-1854), a Scotch author and editor. He was educated at the University of Glasgow and at Balliol College, Oxford; studied for the Scottish bar, but never practiced, and began his literary career in 1817, as a contributor to the newly established *Blackwood's Magazine*. In 1820 he married the daughter of Sir Walter Scott, and in 1825 he succeeded Mr. Gifford as editor of the *Quarterly*

Review. He wrote several novels, a *Life of Burns*, a *History of Napoleon* and a *Life of Scott*. The last is his greatest work, and with the exception of Boswell's *Johnson* it is the best biography in English.

Lockhaven, PA., the county-seat of Clinton co., 68 mi. n. w. of Harrisburg, on the west branch of the Susquehanna River and on the New York Central and the Pennsylvania railroads. The city is in an agricultural and lumbering region and contains planing mills, foundries, tanneries, brick and sewer-pipe works, silk mills and manufactories of paper, cigars and other articles. One of the state normal schools is located here, and the city has a fine courthouse, a hospital and a subscription library. The place was settled in 1769 and was incorporated as a city in 1870. Population in 1910, 7772.

Lockjaw. See TETANUS.

Lockport, N. Y., the county-seat of Niagara co., 26 mi. n. e. of Buffalo, on the Erie Canal and on the New York Central and the Erie railroads. The canal here has a series of five locks, with a lift of 12 feet each, and affords good water power. Near the city are extensive quarries of limestone and sandstone, and the principal manufactures are waterworks machinery, milling and wood-working machinery, pulp, paper, glass, brooms and cereals. The city has a large trade in grain and fruits from the surrounding agricultural region. The prominent buildings are the high school, the Federal building and the courthouse. Saint Joseph's Academy is located here, and there are good public and parish schools. The place was settled in 1823 by workmen on the Erie Canal. It was incorporated in 1829 and was chartered as a city in 1865. Population in 1910, 17,970.

Lockwood, BELVA ANN BENNETT (1830-), an American lawyer and reformer, born at Royalton, N. Y. She graduated at Genesee College, Lima, N. Y., taught school for some years, afterward studied law and was admitted to the bar in Washington in 1873. After laboring for the passage of a law admitting women to practice before the Supreme Court, she was admitted to that practice and acquired some reputation. She was afterward conspicuous in agitation for woman suffrage and was nominated for president of the United States in 1884 and 1888 by the Equal Rights Party.

Lo'co-Fo'co, a name given to a faction of the Democratic party in New York State in 1835, which demanded the rechartering of the United

States bank and was opposed to the chartering of state and private banks by special legislation. The faction received its name from an occurrence at a mass meeting held at Tammany Hall, New York, in October, 1835. The organization Democrats attempted to control the meeting, but being unsuccessful, they turned out the lights and retired. The victors, however, had supplied themselves with friction matches, which were at the time called loco-focos, and, lighting candles, proceeded to transact their business. The regular Democratic press soon took up the incident and dubbed the faction *loco-focos*. Eventually the Whigs applied this name to the Democratic party throughout the country. The faction was finally absorbed into the original organization, through the efforts of President Van Buren.

Locomotive, in the ordinary meaning of the term, a steam engine used to haul cars upon a railway track, but in its broadest sense, any self-propelling engine. Those operated by other than steam power are known as electric locomotives and compressed air locomotives. Those used upon roads and farms are called traction engines (See TRACTION ENGINE). The first successful attempt to construct a self-propelling engine was by a Frenchman named Cugnot in 1796, but the railway locomotive was invented by Richard Trevithick, a Cornish miner, in 1804. While this locomotive was considered a failure commercially, it contained most of the important features successfully used in later patterns. The success of the locomotive is due to George Stephenson, an English engineer (See STEPHENSON, GEORGE). In 1829, at a competitive trial of several locomotives on the Liverpool & Manchester railway, Stephenson's engine, the *Rocket*, was the most successful, and many others were patterned after it. This engine was mounted on four wheels, and had a horizontal boiler 6 feet in length and 5 feet 4 inches in diameter, which contained 25 tubes, each 3 inches in diameter. The cylinders were placed at the rear end of the boiler, just over the fire box, and exhaust pipes led from them to the smokestack. The drive wheels were in front and were connected directly with the piston by connecting rods. When ready for use this engine weighed $4\frac{1}{2}$ tons, and with the tender, $7\frac{1}{2}$ tons. On its trial trip it hauled a load weighing over nine tons at a speed of 15 miles per hour, and on another trip it reached a speed of nearly 30 miles per hour. The success of this locomotive demonstrated the practicability of steam power for railways.

Locomotive

The first locomotives used in the United States were imported from England, but in 1830 one was built at the West Point foundry, and others soon followed. The early American engines copied the English patterns very closely, but the conditions to be met upon American railways made it necessary to deviate from the English type, and soon a distinct type of American locomotive was developed, which, with various modifications and enlargements necessary to meet the constantly growing traffic, is still in general use.

A locomotive consists of a steam boiler of the tubular type (See **BOILER**), a pair of simple or compound engines, a running gear and a wrought iron frame, on which the various parts are so mounted that the engine can travel upon a track. The accessory parts are the *smokestack*, or *chimney*; the *pilot*, for knocking objects off the track; the *cab*, for sheltering the enginemen; the *tender*, for carrying fuel and water; the *injector*, for forcing water into the boiler; the *air brake pump* and necessary appliances; the *sand dome*, the *bell*, the *whistle*, *steam gauges*, *water gauges* and the *safety valve*.

The most common type of American locomotive has a horizontal boiler; four drive wheels, from four feet five inches to six feet five inches in diameter, and connected on each side of the engine by a bar joined to the pistons by connecting rods. The forward end of the machine rests upon a truck, or bogie, of four wheels, and the tender usually has eight wheels arranged in two trucks. Locomotives intended for hauling freight trains may have as many as eight, or even ten, drive wheels. The wheels of these locomotives are smaller than those of passenger locomotives, since in the freight engine great traction power is desired, while speed is not as essential. Some passenger engines, especially those designed for heavy grades, have six drive wheels, and if the engine is designed for high speed, the wheels are six or more feet in diameter. Every device for controlling the locomotive is within easy reach of the engineer, so that by pulling a lever, he opens the throttle valve and lets on the steam, or by pushing it from him, he closes the valve and shuts off the steam. A lever, connected with a link in which the valves work, can be moved forward or backward, and by moving it the engine is reversed and will run as well in one direction as in the other.

The weight of passenger locomotives ranges from 60 to 70 tons, in the older patterns, to as high as 150 and even 180 tons, in the newer patterns, while the largest freight engines weigh

Locust

over 300 tons. The largest locomotive works in the United States are the Baldwin Locomotive Works at Philadelphia. Others of importance are the Rogers Locomotive Works at Paterson, N. J., and the works of the American Locomotive Company, which are located in eight different cities. The total capacity of these works is about 3100 locomotives a year. Of this number 600 are exported to foreign countries, exclusive of Canada and Mexico. The American locomotive is now found on every continent. See **RAILROAD**; **STEAM ENGINE**.

Locomoto'or Atax'ia, a disease of the nervous system, characterized by a loss of the power to move the muscles harmoniously. It is not paralysis, for the person is able to move and even to walk, though with a peculiar halting gait, during which he often falls, because the limbs will not move together. The approach of the disease is slow and long continued, and is often accompanied by partial paralysis. The disease usually continues to a fatal termination, though it is sometimes stopped if treatment is begun in the earlier stages.

Lo'cust, the name rather loosely applied to several insects of different genera. In the



LOCUST

United States, the cicada, or harvest fly, is called a locust, while the real locust of this country is known as the red-legged grasshopper (See **CICADA**; **GRASSHOPPER**). The hind legs of the locusts are large and powerful, so that they have great power of leaping, but their antennae are short, and they differ also from katydids or true grasshoppers in their peculiar notes, which are made by rubbing their hind legs on their wing covers. The Rocky Mountain locust breeds west of the Mississippi River and east of the Rocky Mountains, selecting places along river bottoms or in grassy places of the mountains in the northern part of the region mentioned. The female lays twenty-five or more eggs, cementing them carefully together and covering them with a case, or cocoon, which she buries in the sand. From the first, the young resemble their parent, and after frequent molting they reach their full size in about seven weeks. On reaching matu-

rity they gather in flocks and begin incredibly long migrations, with an apparent definiteness of purpose and regularity of movement that no other insect ever shows. Sometimes they appear in such vast numbers as almost to obscure the light of the sun; toward night or on cloudy days they settle down on the earth and devour everything green they can find. Sometimes within a few hours whole acres of flourishing vegetation have been destroyed. In 1874 the locusts overran the whole territory west of the Mississippi, and it is estimated that \$50,000,000 would not cover the damage they did. The next year 750,000 people were made destitute or suffered severely in Kansas, Nebraska and Missouri. Since that time, though there have been numerous flights of locusts, they have not appeared in such destructive numbers, and it is thought that the cultivation of the land and the destruction of their breeding places has prevented anything of the kind in the future. Migratory locusts are found also in Asia and Africa, where their flights have been as destructive as those of the locusts in this country. Arabs and other natives of the East frequently use the dried insects as food.

Locust, a well-known tree of the United States, with delicate leaves and drooping clusters of white, heavily scented flowers, shaped like pea blossoms. From the tall trunk a hard, durable wood is obtained and used for cog wheels and special purposes in cabinetmaking and shipbuilding. The locust grows best in Kentucky and Tennessee, but as it spreads rapidly and is subject to insect pests, it is losing its popularity.

Lodge, *loj*, HENRY CABOT (1850–), an American statesman and writer, born at Boston, educated at Harvard University and admitted to the bar in 1876. While attaining eminence in his profession, he also wrote many books upon historical and legal subjects, notably *A Short History of the English Colonies in America* and biographies of Daniel Webster, Alexander Hamilton and George Washington. He was elected to Congress in 1887, served three terms and was then elected United States senator. He was reelected in 1899, 1905 and 1911.

Lodi, *lo'de*, a city of Italy, in the Province of Milan, on the Adda River, 20 mi. s. e. of Milan. Its chief buildings are a cathedral, which dates from the twelfth century, and the Renaissance Church of the Incoronata. Linen and woolen goods and silk are manufactured, but the most important industry of the city and the surround-

ing district is the manufacture of cheese. In May, 1796, Napoleon defeated the Austrians at Lodi. Population in 1911, 22,000.

Lodz, *loje*, a town in Russian Poland, in the Government of Piotrkow, 75 mi. w. s. w. of Warsaw, and next to it, the most populous town in Russian Poland. It has extensive trade and manufactures, especially in woollens and cottons, and is, in fact, one of the important cotton manufacturing cities of the world. Population in 1908, 408,330.

Loeb, *lob*, JACQUES (1859–), a German-American biologist. He was educated at Berlin, Munich and Strassburg and became assistant professor of physiology at the University of Würzburg in 1886; two years later he was given a similar position in the University of Strassburg. In 1891 he came to America, to accept an appointment as associate professor of biology at Bryn Mawr College, and in the following year he was called to the University of Chicago. In 1902 he became professor of physiology in the University of California. Professor Loeb specialized in comparative physiology, becoming famous for ingenious experiments upon the subject of reflex action in lower animals, for his researches in the composition of protoplasm and especially for showing the effect of salt solutions on muscles of the heart.

Loess, *löss*, a sandy deposit of the early part of the Quaternary era. It consists of a fine, porous, siliceous silt, containing more or less carbonate of lime, that collects in nodules or tubules which take a vertical position. It was first described from deposits in the Rhine Valley, but it is found in large quantities in all parts of the world. Where the deposits are cut by rivers, they often form bluffs like those along the Mississippi, in some of which the formation exceeds 250 feet in depth. When charged with humus, loess forms excellent soil, but on account of its sandy nature it requires more rainfall than loam (See SOIL). There are numerous theories concerning the formation of loess. Some geologists consider that the deposits on the Great Plains are the bed of a lake which existed during the close of the Glacial period. The deposits along rivers were probably formed by running water, and wind has undoubtedly contributed to the formation of other deposits. See GLACIAL PERIOD; QUATERNARY PERIOD.

Lo'foten or **Lo'foden**, a group of islands off the northwest coast of Norway, measuring about 165 miles in length. The chief islands are Andö, Langö, Hindö, East and West Vaagö,

Log

Moskenäsö and Flakstadö. Most of them are rugged and precipitous, and several of them have mountains. They are for the most part unfertile, though there are some regions which are productive. The Lofoten Islands are especially noted for being the richest fishing grounds in the world. The cod and herring fisheries are especially important and are the chief source of national wealth. About 30,000 fishermen are engaged around the islands. In some places the navigation, even for schooners, is very difficult, because of the tidal currents and the narrow channels between the islands, and near the south end of the group is the whirlpool called Malström. Population in 1910, about 45,000.

Log, a contrivance used in measuring the rate at which a ship travels through the water. The *common log* is a piece of thin board, forming the quadrant of a circle of about six inches radius, so balanced as to float perpendicularly in the water, with the greater part immersed. One end of the *log-line* is fastened to the log, while the other is wound round a reel. The log is thrown out and the length of line unwound in a given time gives the rate of the ship's sailing. This is calculated by knots made on the line at certain distances, while the time is measured by a sandglass running a certain number of seconds.

Lo'gan, UTAH, the county-seat of Cache co., 70 mi. n. of Salt Lake City, on the Logan River and on the Oregon Short Line railroad. The city is in an agricultural and stock-raising district and has flour, lumber and woolen mills, breweries and sugar factories. The state agricultural college, Brigham Young College and the New Jersey Academy are located here. Logan was settled in 1859 and was incorporated in 1866. Population in 1910, 7522.

Logan, JOHN ALEXANDER (1826-1886), an American soldier and statesman, born in Jackson County, Ill. He served in the Mexican War with credit and at its close entered college, graduating from Louisville University in 1852. He was then elected to the state legislature several times, and in 1858 he was sent to Congress, as a Democrat, being reelected after his first term. He resigned to enter the army. He was made colonel of an Illinois regiment, fought at Belmont, Fort Henry and Fort Donelson, and became brigadier general, later major general of volunteers. Logan participated in the Vicksburg campaign and was with Sherman in his march toward Atlanta, taking a conspicuous part in the Battle of Kenesaw Mountain and being twice placed at the head of the Army of

Logarithm

the Tennessee. In 1866 he was reelected to Congress, where he served until 1871. He was one of the managers of Johnson's impeachment trial. He became United States senator, but in 1877 resumed the practice of law, in Chicago; shortly afterward he returned to the Senate,



JOHN A. LOGAN

where he won a reputation as a forceful and eloquent orator. In 1884 he was a leading candidate for the Republican nomination for president, but being defeated, was made the candidate for vice-president. Later he was again returned to the Senate and died in office. He was the author of the *Great Conspiracy* and *The Volunteer Soldier of America*. Consult Dawson's *Life and Services of John A. Logan*.

Lo'gansport, IND., county-seat of Cass co., 72 mi. n. of Indianapolis, at the confluence of the Wabash and El rivers and on the Pittsburg, Cincinnati, Chicago & Saint Louis, the Vandalia and the Wabash railroads. The city has good water power and a supply of natural gas; and the industrial establishments are railroad shops and manufactures of automobiles, motors, lumber, carriages, lime, cement and other goods. The Northern Indiana Hospital for the Insane has its buildings here. The city has a fine courthouse, a Carnegie library, the Holy Angels' Academy, a business college and public high and parish schools. Logansport was first incorporated in 1838. Population in 1910, 19,050.

Log'arithm, the index of the power to which a constant number, called the base, must be

Logarithm

raised to equal a given number. The base most commonly used is 10. Thus, 10^3 equals 1000, and the logarithm of 1000 (generally written $\log 1000$) is 3; $10^{2.9222}$ equals 836; the logarithm of 836 is therefore 2.9222. According to the same principle the following expressions are derived:

$\log .001 = -3$	$\log 10 = 1$
$\log .01 = -2$	$\log 100 = 2$
$\log .1 = -1$	$\log 1000 = 3$
$\log 1 = 0$	$\log 10,000 = 4$

From this table it is evident that the logarithm of any number greater than 1 and less than 10 is fractional; the logarithm of any number greater than 10 and less than 100 is greater than 1 and less than 2; the logarithm of any number less than 1 is negative. In the expression 2.9222, which is the logarithm of 836, the integer 2 is known as the *characteristic*; the decimal is known as the *mantissa*. According to the common system, the mantissas in logarithms of all numbers having the same sequence of figures are the same; thus, $\log .008$ equals 3.9031; $\log 8$ equals .9031; $\log 800$ equals 2.9031. This fact, together with the rules developed above for the formation of logarithms, make it unnecessary to place characteristics in the table of logarithms. Thus, to find the logarithm of the number 18.1 in a book of logarithmic tables, we find opposite 181 the mantissa .257679. Now 18.1 is greater than 10 and less than 100; so, according to the rule given above, its logarithm is greater than 1 and less than 2. Hence, if its mantissa is .257679 its characteristic must be 1. Therefore, the $\log 18.1$ equals 1.257679. The characteristic of the logarithm is always equal to one less than the number of places to the left of the decimal point in its corresponding number (See example given above).

Since the logarithm is an exponent of the power of the base, in performing the fundamental calculations with logarithms the same rules are followed as in algebra. In the example $A^3 \times A^4 = A^7$ ($3+4$), if A is the base of a system of logarithms, 3 and 4 represent the logarithms of two numbers, respectively, and A^3 and A^4 represent those numbers. The expression $A^3 \times A^4$ then represents a process of multiplication. As in algebra we add the exponents to obtain the products of the quantities, so in using logarithms we add the logarithms to obtain the logarithm of the product of the numbers represented by them. In division, one logarithm is subtracted from the other to obtain the logarithm

Logwood

of the quotient. To obtain the logarithm of the square root of a quantity we divide the logarithm of the given number by the number denoting the root to be extracted. In raising a number to the given power we multiply the logarithm of that number by the number denoting the power to which it is to be raised.

Log Book, a book into which the direction of the wind, the course of the ship, the state of the weather at all hours of the day, are daily transcribed at noon, together with every circumstance deserving of notice that may happen to a ship or within her knowledge, either at sea or in a harbor. In the United States navy the record is filled out and signed every day, and when the book is full it is filed among the records of the navy department.

Loggia, *lod'jah*, a word used with several significations. It is applied to a hall open on two or more sides, where there are pillars to support the roof, such as the Loggia de Lanzi in Florence; to an open colonnade, or arcade, surrounding a court, and to an open gallery at the height of one or more stories in a building. The term is also used to designate a large ornamental window, consisting of several parts, often seen in old Venetian palaces; or a small airy hall, usually open on all sides, constructed on the roof of an edifice.

Logic, *loj'ik*, the science of reasoning. Aristotle was the first to set forth the science of logic in a formal manner, and the principles and laws which he established are still recognized. Aristotle's system proceeded from general truths to particular facts by a process of reasoning illustrated in the syllogism (See SYLLOGISM); in method his logic was deductive (See DEDUCTIVE METHOD). A later system, founded by John Stuart Mill, begins with particular facts and proceeds to general truths. This is known as the *inductive system*. See INDUCTION; INDUCTIVE METHOD.

Log'wood, the common name of a tree which grows in moist and swampy places in Central America and on the eastern shores of Mexico, and which has now become naturalized in many of the West Indian islands. The wood, which is red, tinged with orange and black, is so heavy as to sink in water, and it takes a fine polish. The use of logwood, however, is chiefly as a dye wood. The best dyes are obtained from the trees around the Bay of Campeachy. Here, when the trees have grown to a height of from twenty to fifty feet, they are cut down, the heartwood is trimmed out, cut up into short logs and

Lohengrin

then hewn and ground into little chips. From these the color is extracted by water; it is afterward purified and varied by chemicals to such



LOGWOOD

an extent that red, purple, black, violet, lilac, blue and green may all be obtained. An extract of logwood is used as a medicine.

Lohengrin, *lo en grin'*, the hero of a German poem of the end of the thirteenth century, represented as the son of Parsifal and one of the guardians of the Holy Grail. Sent by King Arthur to help the Princess Elsa of Brabant, he arrives in a vehicle drawn by a swan, delivers the princess from captivity and marries her. He accompanies the emperor in a campaign against the Hungarians and fights against the Saracens. He then returns to his bride at Cologne, but being pressed by her to state his origin, he is prevailed upon to tell it, after which he must, by the terms of his vow, return home to the Grail. The legend has been made the subject of a well-known opera by Wagner.

Loire, *hwahr*, (ancient Liger), the longest river in France, which rises in the Cevennes, flows first in a northerly, then in a westerly, direction and empties into the Bay of Biscay. Its whole course is over 620 miles, of which about 490 miles are navigable.

Lombardy

Lok or Loki, *lo'ke*, in Northern mythology, the wicked deity, the father of Hel, goddess of the dead. Although regarded as the personification of evil, he was described as of handsome appearance and well able to fascinate when he chose. His ingenuity far surpassed that of any of the other gods, and when he could, at times, be compelled to exercise it in behalf of the other gods, the results were most beneficial. Ordinarily, however, he was occupied with the most evil plotting, partly from a spirit of mischief and partly from pure wickedness.

Lol'lards, a name applied as a term of contempt to various sects or fraternities deemed heretical. It became well known in England about the end of the fourteenth century, when it was applied to the followers of Wycliffe and to others more or less influenced by his teaching. Later the Lollards drew upon themselves the enmity of the civil powers, and numbers of them were put to death, especially during the reign of Henry V.

Lombards (so called either from the long *barte*, or spear, which they carried, or from the long beards they wore), a Germanic, or Teutonic, people who at the beginning of the Christian era were dwelling on the Lower Elbe. They make little appearance in history till the sixth century, when, under their king, Alboin, they entered Italy in 568, and conquered the northern portion, which hence received the name of Lombardy. Authari, a successor of Alboin, married Theodelinde, a Frankish princess, who began the process of converting the Lombards to the orthodox faith. The only king of note among the successors of her family was Rothari, who in 643 promulgated a system of laws, which, with subsequent additions, became among German jurists the basis of the study of law during the Middle Ages. From 713 to 744 the Lombards had a powerful king in the person of Liutprant, who extended his sway, at least temporarily, over the whole of Italy. From that time the power of the Lombards gradually declined, and finally Charlemagne captured Pavia, after a six months' siege, and put an end to the Lombard kingdom (773 or 774).

Lombardy, *lom'burd y*, the part of Upper Italy which took its name from the Lombards, who invaded and conquered it in the sixth century. The Lombard kingdom was overthrown by Charlemagne. Lombardy was formerly the name of an Italian department embracing what now constitutes eight provinces, Bergamo, Brescia, Como, Cremona, Mantua, Milan, Pavia and

Lombok

Sondrio, and containing an area of 9374 square miles. Population in 1911, 4,786,907.

Lom'bok, an island in the Indian Archipelago, belonging to the Dutch. It lies between Bali on the west and Sumbawa on the east and has an estimated area of 2100 square miles. Rice, corn, tobacco and sugar are raised, and cattle, horses and buffaloes are exported. Brahmans are the ruling class, but the mass of the population is Mohammedan. The capital is Mataram,

London

50 miles from its mouth. This latter fact has given London many of the advantages of a city on the coast. London south of the river, which is the less important part of it, lies in the counties of Surrey and Kent; the portion north of the river is in the county of Middlesex. The commercial and money-making parts of London are in the East End. Here are the port, the docks, the customhouse, the bank, the general postoffice and many public buildings, besides the



1, Houses of Parliament; 2, Westminster Abbey; 3, Buckingham Palace; 4, Saint James Palace; 5, Albert Memorial; 6, Natural History Museum; 7, South Kensington Museum; 8, Zoological Gardens; 9, British Museum; 10, Saint Paul's Cathedral; 11, Bank of England; 12, Tower of London; 13, Greenwich Observatory.

on the west coast. Population, estimated at 325,000.

Lo'mond, **LOCH**, the largest lake in Scotland. It is situated in the counties of Dumbarton and Stirling and is 23 miles in length and from 1 to 5 miles in width. The region around here is especially famous for its beautiful and picturesque scenery.

London, *lun'don*, the largest city in the world, the capital of the British Empire, is located in the southeastern part of England on the Thames River, which runs through the city from east to west. The Thames is about 230 miles in length and is navigable by sea-going vessels for

great Saint Paul's Cathedral. That part of London which lies west of the Temple contains the Houses of Parliament, Westminster Abbey, the royal palaces, the government offices, the British Museum, picture galleries and the residences of the aristocracy and wealthy citizens. London, as it was politically organized in 1888, is about 16 miles long and about 10 miles wide, covering an area of about 117 square miles. Outside these limits, however, is a wide area extending about 15 miles in every direction from Charing Cross, the official center of the metropolis, and embracing the metropolitan and city police districts. The area of this Greater London

London

is about 700 square miles. The city of London proper, or "the city," is a separate municipality, having a civic corporation of its own, at the head of which is the lord mayor of London. The city in this sense covers only 668 acres, and the resident population in 1911 was about 20,000.

London is not a beautiful city, although it has many magnificent buildings and some fine streets. It is on low ground, and from no one place can a general view of the city be obtained. The business portions are densely crowded, the streets are narrow and crooked, and the fogs and smoke have rendered the buildings dingy and unattractive in appearance. London east of the city proper is one of the most densely crowded and poorest places on earth. Poverty and disease make the death rate of this section one of the highest known. In striking contrast to this are the homes of the lower middle classes, to the north of the city, where, in cheap and neat houses, hundreds of thousands dwell in comfort, and the other thousands of luxurious homes of the wealthy middle class and the aristocracy, far out to the west. London is practical and commercial, and the city has grown because of its business importance, a fact which accounts to a great extent for the crudity of its plan and the oppressiveness of its general appearance. Communication between different parts of the city is effected by cabs, tramway cars, omnibus lines, street railways and steamboats, which ply regularly along the Thames. Elaborate systems of underground railways connect different parts of the city and join the terminal stations of the great railways. In order to dispose of the soil taken from the underground tunnels, or tubes, without detriment to the streets, it has been necessary to put them at a great depth and to work from the ends of the route into the city. American capital has been largely interested in these projects and has gradually obtained control of them. Yet the problem of rapid transit within the city has not been satisfactorily settled, for it is a tremendous task to move the millions of people whom business requires to travel about from day to day. London has excellent communication with all parts of the United Kingdom and with the outside world through the Thames River and the numerous railways, several of which have elegant stations at their terminals. The river is spanned by a number of broad, expensive bridges, some of which have been constructed on the site of other structures erected hundreds of years ago, and all of which are so arranged as not to interfere with navigation.

London

STREETS AND PARKS. Among the noted streets which run from east to west are Piccadilly and Pall Mall; the Strand and its continuation, Fleet Street; Oxford Street and its continuations, Holburn, Holborn Viaduct and Cheapside. The Thames Embankment, otherwise known as the Victoria Embankment, which runs along the north shore of the river from the Houses of Parliament east, is a magnificent thoroughfare, adorned by important buildings and ornamented with parks and statuary. The river is held in control by a solid granite embankment, through which, at intervals, steps give access to the steamers. Hyde Park, containing about 400 acres, is surrounded by a carriage drive $2\frac{1}{2}$ miles long. This is the most fashionable of the royal parks and, together with Regent's Park, Saint James's Park and Green Park, is located in the West End. Regent's Park, to the northwest, contains the gardens of the Zoölogical Society, with the largest collection of animals in the world, and the gardens of the Royal Botanic Society. Other parks are located in different parts of the city, and more are being provided for as places of rest and recreation for the crowded inhabitants. On the southern side of the city is Greenwich Park, naturally one of the most beautiful, and famous as being the location of the Greenwich Observatory. More characteristic of London than its formal parks are the heaths, or commons, which are preserved nearly in their natural condition for the use of the people. Hampstead Heath, to the north, and Black Heath and Plumstead Common, on the southeast, are the largest.

PUBLIC BUILDINGS, MONUMENTS AND INSTITUTIONS. Saint James's Palace, erected by Henry VIII; Buckingham Palace, built by George IV; Marlborough House; Kensington Palace, the birthplace of Queen Victoria, and others are among the royal palaces which grace the city. The imposing Houses of Parliament stand on the north bank of the Thames, in the West End. The Tower of London is farther east on the same side of the river (See TOWER OF LONDON). The Bank of England; the Royal Exchange; the Mansion House, which is the official residence of the lord mayor; Guild Hall, the seat of municipal government, and the four Inns of Court are noteworthy buildings. The new Law Court is one of the most important of recent public structures. Saint Paul's Cathedral, completed in 1710 by Sir Christopher Wren, is a magnificent building, 510 feet in length, with a great dome 400 feet in height, the most conspic-



TRAFALGAR SQUARE AND NELSON MONUMENT, LONDON

It has been said that if one Englishman, for any reason, wishes to find another Englishman, he need not institute a world-wide search. If he will but be patient the man wanted will one day appear in Trafalgar Square

London

ous of London's buildings. Westminster Abbey adjoins the Houses of Parliament (See WESTMINSTER ABBEY). London is noted for its museums and galleries (See BRITISH MUSEUM). The South Kensington Museum occupies a capacious series of buildings which contain valuable collections in science and the fine arts, and the natural history department of the British Museum is located in an elegant building at South Kensington.

Notwithstanding its fogs and dirt, London is, taken as a whole, one of the healthiest cities in the world, and its public and charitable institutions are numerous. Hospitals and institutions for the care of the defective classes are well managed, and in recent years charitable work has been carried on extensively among the poorer classes.

On Fish Street Hill is a monument 202 feet high, erected in commemoration of the great fire of London; in Waterloo Place is the York Column, and in Trafalgar Square, the beautiful Nelson Column, at the base of which are the four famous bronze lions, the work of Sir Edwin Landseer. On the Thames Embankment is Cleopatra's Needle, a granite obelisk, companion to the one in Paris, that was brought to Europe from Egypt. Elsewhere in the city are many beautiful monuments and statues (See ALBERT MEMORIAL).

GOVERNMENT. In 1900 the government of that portion of the city outside of London proper was very much simplified by consolidation; the more than 500 public bodies, with a membership of over 10,000, ceased to exist, and the whole territory was divided into 28 boroughs, or municipalities, governed by councils. Each council has a mayor, not more than 10 aldermen and 60 councilors. One-third of the councilors may be elected each year, or all of them every three years. The system of taxation was also very much simplified. The metropolitan police is not a municipal organization, but is administered by the government. It is a large force, whose central offices are New Scotland Yard, a massive building near Westminster Bridge. The postal authorities divide Greater London into districts, designated as E. C. (East Central), W. C. (West Central), etc.

COMMERCE AND INDUSTRY. The commerce of London is enormous. Besides that which is transacted over the railways from the ports Southampton and Liverpool, and the internal commerce with the other cities of Great Britain, there is an enormous tonnage from all parts of

London

the world coming to the docks, which extend along the river from London Bridge eastward. London is the great port for the produce of the East and West Indies. Tea, sugar, tobacco, wine, tallow, hides and drugs are among the most important imports, and all these form large items. The value of the imports is estimated at more than one-third that for the entire United Kingdom. The manufactories of London are almost limitless in number and capacity. The largest breweries and sugar refineries in the Kingdom are located here; extensive chemical works, soap manufactories and dye works are also to be found; silk weaving is an important industry; metal manufactories of all kinds, as well as manufactures of clothing and articles necessary to the shipping trade, are correspondingly greater than in smaller cities. In fact, it is impossible to give any clear idea of the extent and character of the varied industries which have made London what it is.

HISTORY. The southern part of Britain was made a Roman province during the reign of Claudius, and in the time of Constantine the Romans fortified and walled the camp and made it their great commercial city. At the time of the Conquest, in 1066, London submitted to William and received from him a charter which is still preserved. Other charters were granted by subsequent rulers. In the fifteenth century some of the principal streets were paved, but for many years afterward the sanitary conditions remained terrible. In December, 1664, began the great plague which carried off about 69,000 persons. In 1666 the great fire broke out, destroying 14,200 buildings and spreading over 336 acres. Many improvements were made in rebuilding, and from that time the growth of the city was rapid. The last time that the peace of London was seriously threatened was in 1780, when the Gordon riots took place and for two days terrified London. The growth and improvement at present are even more rapid than they have been at any time in the past.

POPULATION. In 1891 the population of Greater London was over 5,000,000. In 1901 it was 6,578,784, and in 1911, 7,251,358.

London, a city of Canada, the capital of Middlesex co., Ontario, 121 mi. s. w. of Toronto, on the river Thames and the Canadian Pacific, the Grand Trunk, the Michigan Central and the Pere Marquette railroads. London is in the center of a fine agricultural region and is the shipping point for western Ontario. It has

extensive rolling mills and stove works employing thousands of people. Western University, Huron College and Sacred Heart Academy are located here. Population in 1911, 46,177.

London, JACK (1876-1916), an American novelist, born in San Francisco. Though he took the freshman year in college, the education which fitted him for his literary career was his varied experience as a longshoreman, a sailor before the mast, a gold hunter in the Klondike, and as a care-free man tramping across the continent. He was a voluminous and powerful writer, and among his works which have been favorably received are *The Call of the Wild*, *The People of the Abyss*, *The Sea Wolf* and *The Valley of the Moon*. He was a contributor to numerous monthly magazines.

Long Beach, CAL., a city of Los Angeles co., on San Pedro harbor, 20 mi. s. of Los Angeles, and on the Southern Pacific and Salt Lake railroads. The city has an important trade in farm produce and lumber, and is an attractive seaside resort. Population in 1910, 17,809.

Long Branch, N. J., a town in Monmouth co., 45 mi. by rail and 35 mi. by water from New York City, on the Atlantic Ocean and a branch of the South Shrewsbury River, and on the Pennsylvania and the Central of New Jersey railroads. Long Branch was first settled in 1607. It now has large hotels and boarding houses, picturesque cottages, and bathing houses, parks and places of amusement, which accommodate many thousands during the hot weather. Ocean Grove, which extends along the high bluff overlooking the sea, is a favorite walk. Population in 1910, 13,298.

Longevity, *lonjev'i ty*, long duration of life.

It is purely a relative term, since some forms of plants and animals live on the average but a few hours, while others live for thousands of years. Two causes may produce unusually long life—heredity and environment—and each may limit or offset the effect of the other. In general it is known that forms of life which take long to develop and which reproduce late in life usually live longer than those which mature early and reproduce in their first stages. A crocodile has been known to live considerably more than a century. It has been reported that some fish live for one hundred fifty years, and certain species of birds, such as the heron, goose and swan, have sometimes lived to the age of one hundred or more. Of mammals, man, the elephant and the whale are the only ones that ever live longer than one hundred years, and

there are but few cases of human life extending over one hundred and eight. The horse and the bear frequently live to the age of forty, and one horse has been reported as still living at the age of seventy. Some ants have been known to live for fifteen years. The modern sciences of sanitation, medicine and surgery have increased the average duration of man's life perceptibly. According to the census of 1890, the average age at death of persons in the United States was 31.1 years. Since that time it has risen to 35.2 years.

Longfellow. HENRY WADSWORTH (1807-1882), an American poet, born February 27, 1807, at Portland, Maine. His mother, who claimed descent from John Alden (which see), was a gentle and devout woman, and his father was a most sensible and large-spirited man. Thus the refined, wholesome home influences of his childhood and youth gave final impress to a character naturally amiable, sympathetic and unselfish. At the age of fourteen he entered Bowdoin College, where he so distinguished himself in the study of modern languages that he was sent to Europe to prepare for the professorship which he held in that college from 1829 to 1834. In 1831 he married Miss Mary Potter, of Portland, a gifted and charming woman; and in 1834 he published his first important work, *Outre Mer*, a volume of prose sketches. He was elected in 1835 to the chair of modern languages and literature in Harvard University, and after another year spent in Europe in the study of Scandinavian languages and literature he entered on a professorship which was to last, with interruptions, for seventeen years. Before his return to America, however, he lost his wife, who died at Rotterdam in 1835. For a period of six years he remained at Harvard, living in the old Craigie house, where the prose romance, *Hyperion*, was published (1839), and the *Voices of the Night* (1839), *Poems on Slavery* (1842) and the *Spanish Student*, a drama in three acts (1843), were written. Then, for a third time, he went abroad. Returning, he resumed his professorship and retained it until 1854. His remaining years were quiet, contemplative and uneventful, except for the one tragedy which broke their serenity—the death of his second wife, who was burned before his eyes in their Cambridge home.

In 1847 *Evangeline* was published; in 1855, *The Song of Hiawatha*; and in 1858, *The Courtship of Miles Standish*, all thoroughly American in theme and sentiment. In 1863 *Tales of the Wayside Inn* appeared; in 1867, *Flower de Luce*, and in 1868 came *The New England*



HENRY WADSWORTH LONGFELLOW



LONGFELLOW'S HOME AND HIS STUDY

Long Island

Tragedy, which, with *The Golden Legend* (1852) and *The Divine Tragedy* (1872), forms the trilogy, *Christus*. In company with his three daughters, Longfellow made a last trip to Europe in 1868-1869. While abroad he received the degrees of LL.D. and D.C.L. from the universities of Cambridge and Oxford, respectively. And when he died, in 1882, his bust was placed in the Poets' Corner in Westminster Abbey, an honor which had never been accorded to any other American. *Three Books of Song*, *Aftermath*, *The Hanging of the Crane*, *Morituri Salutamus*, the *Masque of Pandora*, *Keramos* and *Ultima Thule* were the chief productions of Longfellow's later years.

Longfellow's power of graceful translation is seen in *The Poets and Poetry of Europe* (1845) and in the translation of Dante's *Divine Comedy* (1867), but his fame rests chiefly upon his three American epics. Though he possessed wide culture and his poetry is remarkably free from vulgarity, he is preëminently the poet of the common people. The truths he expresses may be commonplace, but they are realized by him with such fresh force and are so simply and sympathetically told that his power of appeal is unusually great among a large body of people for whom the more abstruse poets have no message. Refined in sentiment, musical in form, stimulating in effect, his verse is one of the most potent influences in American literature. His influence in his own day lay not only in his writings, but in the fact that he was one of the first American scholars to introduce into America the culture and learning of European countries. In all his work as a lecturer in college, he strove to present to his students the spirit and beauty of foreign literature, to widen their outlook. Of the briefer biographies of Longfellow the most satisfactory are those by Thomas W. Higginson and F. H. Underwood. The biography by Samuel Longfellow is a more extended work of two volumes. See **READING**, Volume V.

Long Island, an island belonging to the State of New York, of which it forms the southeastern extremity. It is about 118 miles in length, and varies from 12 to 23 miles in breadth, while its area is 1682 square miles. It is connected with New York City by two great suspension bridges across East River (See **BRIDGE**, subhead *Suspension Bridges*) and is separated from Connecticut by Long Island Sound. There are considerable tracts covered with timber; the most fertile portions are carefully cultivated, and much produce is supplied for New York

Long Parliament

and Brooklyn. Railways are numerous. The chief city is the borough of Brooklyn, which is a part of Greater New York.

Long Island, BATTLE OF, a battle of the Revolutionary War, fought on Brooklyn Heights, August 27, 1776, between an American force of 8000 under Israel Putnam, and a British force of 15,000 under General Howe. The Americans were attacked from four directions, and though they fought gallantly for more than four hours, they were compelled to flee, many surrendering. The British loss was about 400; the American loss, about 1400 in killed, wounded and captured. The battle decided Washington to evacuate his position on Long Island.

Long Island Sound, an arm of the Atlantic Ocean, between Long Island and the State of Connecticut, about 110 mi. long and from 20 to 25 mi. wide. It is connected with New York Bay by the strait called East River.

Longitude, *lon'ji tude*, in geography, the distance of a place due east or west from a meridian taken as a starting point, this distance being measured along the equator or a parallel of latitude. Longitudes are generally reckoned from the meridian of Greenwich; the meridians of Paris, Ferro and Washington are or have been also employed. Since the parallels of latitude get smaller toward the poles, at which all the meridians converge, it is evident that degrees of longitude which are $69\frac{1}{2}$ statute miles long at the equator get shorter toward the poles, at which they finally become 0. As the earth makes one revolution on its axis, that is, turns through 360° of longitude from west to east, in twenty-four hours, if the sun or a star is on the meridian of any place at a particular time it will be on the meridian of another place 15° west of the first in one hour. Thus, 15° of longitude represent one hour of difference in time, and hence longitude may be easily determined by the use of the chronometer set to Greenwich time, which is the method commonly employed at sea. Longitude is reckoned to 180° eastward or westward of the fixed meridian. See **LATITUDE**; see **ARITHMETIC**, subhead *Longitude and Time*, Vol. VI.

Long Parliament, the name given to the Parliament of Charles I which assembled in 1640 and was not formally dissolved until March, 1660. Summoned to supply Charles with the means of subduing the insurgents in Scotland, it refused to proceed to this business until it had secured the redress of certain grievances, and its first acts were the impeachment of Strafford and Laud and the abolition of the courts of High

Longstreet

Commission and Star Chamber. After its grievances had been attended to, Parliament turned its attention to religious questions, and here disagreement speedily arose. It was this Parliament which conducted the civil war against Charles I, and before the close of that struggle the Independents in the army had become strong enough to demand the withdrawal from Parliament of the Presbyterian members, who considerably exceeded in number the Independents. The name *Rump Parliament* is given to the body which remained. The Rump Parliament put Charles to death and established the Commonwealth, but Cromwell dissolved the body. After Cromwell's death it was called together again, but its only act of importance was to order a new election and vote its own dissolution.

Long'street, JAMES (1821-1904), a distinguished American general, born in South Caro-



JAMES LONGSTREET

lina. He graduated at West Point in 1842, saw service on the Mexican frontier and was brevetted captain and major for gallantry. When the Civil War broke out he gave up his commission in the army and joined the Confederate forces. He fought in the Seven Days' Battle, in the second Battle of Bull Run, at which his arrival at the right time turned defeat into a Confederate victory, at Fredericksburg, at Gettysburg, at Chickamauga and in the Battles of the Wilderness. After the war he held important govern-

Lorain

ment positions, among them those of minister to Turkey and United States commissioner of railroads, which post he held at the time of his death.

Loo'-Choo', Lu-Chu, Liu-Kiu, Liu-Chiu, or Riu-Kiu, a chain of 55 islands in the Pacific Ocean, between Japan and Formosa. The largest island is Okinawa-Shima, or Great Loo-Choo, which has an area of about 500 square miles. The chief products of the islands are sugar, rice, wheat, maize and sweet potatoes; but cotton, sago, tobacco, indigo, figs and bananas are also grown. The inhabitants are mainly of a race akin to the Japanese. Since 1874 the archipelago has belonged to the Japanese Empire. Population, 453,550. See JAPAN.

Look'out Mountain, BATTLE OF. See CHATTANOOGA, BATTLES OF.

Loom. See WEAVING.

Loo'mis, CHARLES BATTELL (1861-), an American humorous writer. He was born in Brooklyn, N. Y., was educated in the Polytechnic Institute of Brooklyn and was in business as a clerk from 1879 to 1891. In addition to stories in nearly all the periodicals, he has published several volumes. Among his books are *Cheerful Americans*, *The Four-Masted Catboat*, *More Cheerful Americans* and *Yankee Enchantments*.

Loon. See DIVER.

Lope de Vega, lo'pay da va'ga. See VEGA CARPIO.

Lo'quat, a Chinese and Japanese fruit, cultivated in the sub-tropical countries of Europe and in California and Florida. The tree is an evergreen and has a height of 20 to 30 feet, but when cultivated, it is not allowed to exceed 12 feet. The fruit is pear-shaped, yellow and about an inch in diameter. The seeds have a fine flavor. A number of improved varieties have been developed in California.

Lorain', OHIO, a city in Lorain co., 25 mi. w. of Cleveland, on Lake Erie at the mouth of the Black River, and on the Baltimore & Ohio, the New York, Chicago & Saint Louis and the Lake Shore Electric railroads. It is in a natural gas region and forms an important outlet for the central Ohio coal fields. There is a good harbor, and large quantities of lumber, iron ore and grain are also exported. The industrial establishments include steel mills, foundries, shovel works, brickyards and shipbuilding plants. The city has a public library, Saint Joseph's Hospital and more than a score of churches. It was settled in 1822 and was incorporated as a village in 1873 and as a city in 1895. Population in 1910, 28,883.

Lorca

Lor'ca, a town of southern Spain, in the Province of Murcia, 42 mi. s. w. of the city of Murcia. It consists of an old Moorish town, on a slope crowned by a castle, and a lower modern town. There are manufactures of coarse woollens, linens, leather, saltpeter and powder. In the vicinity are lead mines. In 1802 the dam, which has been constructed for irrigation purposes, was broken, and the water from the great reservoir flooded the valley, causing great loss of life. Population in 1910, 72,795.

Lorelei, *lo're li*, a rock in the Rhine River, on the right bank, about 430 feet high. Its extraordinary echo gave rise to the legend that the rock was the home of a siren who, by her wonderful singing, lured all who passed by on the river to destruction. This legend is the subject of a beautiful poem by Heine.

Lo'renz, ADOLF (1854-), an Austrian surgeon, famous for his bloodless operations for the cure of deformities, especially the straightening of clubfoot and the reduction of hip dislocations. Doctor Lorenz has twice visited the United States, and in both instances he performed his remarkable operations in clinics for the instruction of other surgeons. His second trip was at the expense of a wealthy Chicagoan, in order that he might operate on a young daughter whose hips had been dislocated from birth. In this, Doctor Lorenz was successful, as he was in many other operations, which he performed without expense on poor children, who were brought to him at the clinics. He has published a number of important works, some of which have been translated into English. See ORTHOPEDICS.

Loreto, *lo ra'to*, a city of Ancona, Italy, 15 mi. s. e. of Ancona. It is especially noted as a great Catholic pilgrimage resort, and it is believed that here is the *Santa Casa*, said to be the house in which Christ lived at Nazareth with his mother and Joseph. There are many decorations here by the great masters. Population in 1911, 5300.

Lor'imer, GEORGE HORACE (1868-), an American editor and story writer. He was born in Louisville, Ky., the son of a Baptist clergyman, and was educated at Colby and at Yale. He entered upon a business career and later took up newspaper work. In 1899 he became editor of *The Saturday Evening Post*, and after that date he published *Letters from a Self-made Merchant to His Son* and *Old Gorgon Graham*. Both of these volumes contain truths and aphorisms of the business world, expressed so interestingly and pithily that the books enjoyed

Los Angeles

an extensive popularity immediately upon their publication.

Lo'ris, a lemur found in the East Indies. It has a round head, long limbs, short muzzle, large eyes and no tail. One species is called the *slender loris*. All sleep during the day rolled up in a ball and clinging with all four feet to a branch. They are slow and stealthy and live upon birds, insects and vegetables. The *slow loris* is larger than the slender loris and is held in reverence by the Malays because of its odd appearance and retiring habits.

Lorne, JOHN, Sir. See ARGYLL, JOHN DOUGLAS SUTHERLAND CAMPBELL, Ninth Duke of.

Lorrain', CLAUDE. See GELÉE, CLAUDE.

Lorraine. See ALSACE-LORRAINE.

Lo'ry, a group of climbing birds belonging to the parrot family, with broad tails and dense, soft, brilliantly colored plumage. They live chiefly upon honey, which they are able to extract from flowers by means of their brush-tipped tongues. An Australian species has a bright green head and a blue body, marked on the under parts with red. The collared lory is easily taught to speak.

Los Angeles, *los an'gel es* or *an'jel es*, the county-seat of Los Angeles co. and the largest city in southern California, is situated on the Los Angeles River, 20 mi. from its mouth and 480 mi. s. by e. of San Francisco, on the Southern Pacific, the Atchison, Topeka & Santa Fé and the San Pedro, Los Angeles & Salt Lake railroads. The city is well laid out and is noted for its broad streets, many of which are well paved and all of which in the residential sections are embowered in palmetto palm, eucalyptus and other trees and various forms of tropical shrubs and flowers. The beauty of the city and its surroundings, together with its mild and equable climate throughout the year, has made Los Angeles a famous resort, and it is visited annually by thousands of tourists. The city has an elaborate park system, containing fourteen parks, the oldest of which is the Plaza, within the city limits; and another very frequently visited is Central Park, noted for its beautiful trees and flowers and for the soldiers' monument. Elysian Park is of interest because of Fremont's Gate, erected in honor of the great explorer, and its botanical gardens, which contain a great variety of trees, shrubs and flowers, gathered from nearly all parts of the world. Griffiths, the largest park, is in the foot hills without the city limits and contains about 3000

acres. An elaborate system of boulevards is in process of construction and when completed will connect all of these parks.

Among the public buildings of note are the Federal building, the city hall, the chamber of commerce, Blanchard Art Building, Huntington Building, the Angelus, the Van Nuys and the Lankershim hotels. Among the most noted churches are the Roman Catholic Cathedral; Saint Paul's Cathedral, Episcopal; the First Congregational, the First Methodist Episcopal, the Immanuel Presbyterian and the Old Plaza church, of interest—historically as the headquarters of General Fremont. The city has a public library of about 100,000 volumes; it is also the seat of a state normal school and of the University of Southern California, Saint Vincent's College and Occidental College.

Los Angeles is in the center of a large fruit-growing region, which produces oranges, lemons, olives, prunes and numerous other fruits. Consequently, it is an important fruit market. Near by are oil wells, which furnish an abundance of cheap fuel for manufacturing purposes, and since 1900 the manufacturing industries of the city have developed very rapidly. Important among these is the refining of petroleum. Other manufactures consist of flour and grist mill products and such industries as meet the local demands, as much material can be manufactured in the city more cheaply than it can be imported from the eastern and central sections of the country. The city has regular steamer connection with San Francisco and other ports, through San Pedro, its seaport, 25 miles distant, with which it is connected by steam and electric railways. Near by are numerous suburbs noted for their beauty and as health and pleasure resorts. Among these are Hollywood, Santa Monica, Riverside, Redondo Beach, Redlands and South Pasadena, celebrated for its ostrich farm. The various parts of the city and these near-by towns, as well as numerous other points of interest, are all connected by one of the best systems of electric railways in existence.

Los Angeles was first visited by white men in 1769 and was named by the governor of that territory *Puebla de Nuestra Señora la Reina de Los Angeles*, which means "The City of Our Lady, the Queen of the Angels." The city was not really founded until 1781. From that time it grew slowly for a number of years, and previous to the American occupation it was for a time capital of the province. It surrendered to the United States troops in 1846 and in 1851 was

chartered as a city. After the construction of railway lines into southern California, the city began to increase in population rapidly, and the discovery of petroleum in the vicinity gave an additional impetus to its already thriving industries. Population in 1901, 102,479; in 1910, 319,198.

Los'ing, BENSON JOHN (1813-1891), an American historical writer, born in Beekman, N. Y. Beginning life as a journalist and publisher, he first attracted attention by his interesting pictorial field book of the Revolution, which was followed after some years by similar works upon the Civil War and the War of 1812. His researches in the preparation of these volumes led to the writing of several historical works, of which the chief are a series of school histories, a large history of the United States, *Life and Times of Philip Schuyler*, *Encyclopedia of United States History* and *The American Centenary*.

Loti, *lo'te*, PIERRE (1850-), a French sailor and author. He entered the navy in 1867, remained in the service until 1898, served with distinction in the Tonquin campaign and was decorated with the ribbon of the Legion of Honor in 1887. His works include *Aziyadé*, *The Marriage of Loti*, *Madame Chrysanthème* and *The Romance of a Child*. Loti was made a member of the French Academy in 1891.

Lot'tery, a scheme for the distribution of prizes by chance, the plan being generally to have a certain number of prizes and a much greater number of numbered tickets. The prizes are allotted to the holders of tickets which bear the same numbers as others drawn by chance from a receptacle. In the United States, lotteries were formerly very commonly resorted to as a means of assisting colleges or benevolent institutions, but they have been abolished. By act of Congress they are deprived of the use of the mails.

Lo'tus, a name given to a number of different plants. One grows in Egypt. It is a beautiful water lily, with large, white and fragrant flowers and immense, wide-spreading leaves. This lily was held sacred to Osiris in ancient times and was a symbol of the creation of the world. The lotus often appears in Egyptian paintings and is used in the decoration of the capitals of the Egyptian columns. The Arabs prize it and believe its fruit to be a food of paradise. In the United States the yellow water lily, or water chinquapin, is generally called the lotus (See NELUMBO), but the plant which is known by

Lotze

botanists as the lotus is a little creeping herb, which is chiefly grown in temperate regions throughout the world. Four or five species are



AMERICAN LOTUS

found in Great Britain, where they are known as bird's-foot trefoil and cat-in-the-clover and by other fanciful names.

Lotze, *lo'tse*, **RUDOLF HERMANN** (1817-1881), a German philosopher and physiologist, born at Bautzen. Lotze's philosophy rests on the belief that everything in the universe has its cause in the notion of the Good, and that this notion underlies all the activities and phenomena of the world. His greatest research was in psychology, and he was one of the leading authorities on physiological psychology. His writings, which have been very influential in the United States, include *Universal Pathology*, *Logic*, *On the Idea of Beauty*, *Medical Psychology* and *System of Philosophy*.

Loubet, *loo bay'*, **EMILE** (1838-), a French statesman and president of the Republic. He began his career as a lawyer and rose rapidly. He was elected to the Chamber of Deputies in 1876 and to the Senate in 1885. In 1887 he became minister of public works, five years later he became premier and on the death of President Faure, in 1899, he was elected president of France. The country prospered under his administration. He was succeeded in 1906 by Fallieres.

Louis I, *loo'is*, called *the Debonair* or *the Pious* (778-840), the son of Charlemagne, succeeded his father in 814 as king of the Franks and emperor of the West. In 817 he divided his dominions among his three sons, Lothair, Pippin and Louis. In 829, in consequence of the urgent solicitations of his second wife, Judith of Bavaria, who had borne him a son, he made a new division of the Empire. The result was that the elder brothers revolted and commenced a war, which, with varying fortune to the parties

Louis

concerned, lasted till the death of the emperor. He was succeeded as emperor by his son Lothair I; and by the Treaty of Verdun in 843 his son Charles the Bald obtained the territories from which France as a separate nationality developed; while another son, Louis the German, obtained territories from which the distinctive German nationality developed.

Louis IX, known as *Saint Louis* (1215-1270), king of France, eldest son of Louis VIII, succeeded to the throne in 1226. In the year 1244, when sick of a dangerous disorder, he made a vow to undertake a crusade to Palestine; and in 1248 he sailed with his wife, his brothers and a large army to Cyprus, whence in the following year he proceeded to Egypt. He was taken prisoner by the Mohammedans and released only on the payment of a large ransom, and it was not until the year 1252 that he returned to France. For the next fifteen years he employed himself in improving the condition of the people by wise laws. In 1270 he determined to undertake another crusade. He sailed to Africa, besieged Tunis and took its citadel, but a contagious disorder broke out, to which he himself fell a victim, together with a great part of his army. In 1297 he was canonized by Boniface VIII.

Louis XI (1423-1483), king of France, son of Charles VII. On his father's death, in 1461, he assumed the crown. The great object of Louis was the consolidation of France, the establishment of the royal power and the overthrow of the great vassals. In achieving this end he was very successful, although the means he used were most unscrupulous. He encouraged manufactures and trade and did much for the good of his kingdom, but was cold-hearted, cruel and suspicious. In 1481 Louis, who had been twice affected by apoplexy, haunted by the fear of death, shut himself up in his castle and gave himself over to superstitious and ascetic practices.

Louis XII (1462-1515), king of France from 1498 until his death. He was the son of Charles, duke of Orleans, grandson of Charles V, and came to the throne on the death of Charles VIII, whose widow he married. In Italy he conquered the Duchy of Milan, took possession of Genoa and fought with Ferdinand the Catholic for the kingdom of Naples. He also took part in the League of Cambrai against the Venetians, whom he defeated at Agnadello. In 1510, however, he had to face the Holy League, formed against him by the pope, Venice, England

Louis

and the Swiss. He was beaten at Novara by the Swiss and by the English at the Battle of the Spurs. He married, a short time before his death, Mary, the sister of Henry VIII of England.

Louis XIII (1601–1643), king of France, the son of Henry IV, ascended the throne in 1610, under the regency of his mother, Maria de' Medici. In 1614 Louis was declared of age, but for three years longer his mother managed to keep the power in her hands. She was at length banished from court, and the chief authority fell into the hands of various ministers. From 1624 Louis was almost completely under the guidance of Cardinal Richelieu, whose policy of oppression of the Huguenots brought on a war. Eventually Rochelle, the headquarters of the Huguenots, was captured (1628), and the revolt was put down. Louis was now induced by Richelieu to take part in the Thirty Years' War, and he gained frequent successes over the Austrians and Spaniards, adding Roussillon and Alsace to France.

Louis XIV (1638–1715), king of France, known as *Louis the Great*, son of Louis XIII and Anne of Austria, succeeded his father in 1643. His minority was occupied by the continuation of wars against Austria; by war with Spain; by the struggles of the parlement against the regent and Mazarin, and by the bloody troubles of the Fronde. In 1659 peace was concluded with Spain, and Louis married the daughter of Philip IV of Spain. On the death of Mazarin, in 1661, Louis resolved to rule without a minister. He reformed the administration and the taxes and chose as his chief adviser the famous Colbert, who accomplished a series of financial reforms, created the Company of the Indies, made roads and canals and founded manufactories. In 1662 Louis purchased Dunkirk from the needy Charles II of England. On the death of the king of Spain he claimed Franche-Comté, Luxemburg and various provinces of the Netherlands and invaded those territories, Turenne and Condé leading his armies. In 1672 he declared war with Holland, and in a few weeks he had conquered three provinces; but the formation of an alliance by the emperor, William of Orange, Spain and Denmark checked his ambition. Still the Treaty of Nimeguen (1678) left Louis in possession of Franche-Comté and a part of Flanders.

He was now at the height of his glory, and the splendor of his court far outshone that of other European courts. His wife died in 1683, and

Louis

Louis secretly married Madame de Maintenon about 1684. She is said to have had a considerable part in the revocation of the Edict of Nantes, which proved most unfortunate for France, by driving many industrious Protestants into exile. Louis's ambitious designs continued, and led, in 1689, to the formation of the League of Augsburg by Spain, Holland, England, the emperor and various small states. A general war continued with frequent and severe losses to the French till the Peace of Ryswick (1697), by which Louis was forced to restore all of his recent conquests and most of the acquisitions made since the Peace of Nimeguen. The question of the Spanish Succession once more brought Louis into conflict with a united Europe. The principal episodes of the war were the defeats of the French at Blenheim, Ramillies and Malplaquet; but circumstances favored Louis, and hostilities were terminated by the Peace of Utrecht in 1713, without altering the relative position of the combatants. His brilliant reign left France impoverished and most of her industries languishing. Louis was succeeded by his great-grandson, Louis XV.

Louis XV (1710–1774), king of France, great-grandson of Louis XIV, began his reign in 1715, but did not actually assume the government himself till 1723. In the interval the country was under the regency of the duke of Orleans, by whose folly it was brought to the verge of ruin. In 1726 Louis placed his tutor, Cardinal Fleury, at the head of the administration. In 1725 Louis had married Maria, the daughter of Stanislas Leszczynski, the dethroned king of Poland, and in 1733 he became involved in a war in support of his father-in-law's claims. After two campaigns he acquired for Stanislas the duchy of Lorraine. After the death of Charles VI, in 1740, the War of the Austrian Succession broke out, in which the victories of Count Maurice of Saxony gave new splendor to the French arms; and by the Peace of Aix-la-Chapelle, in 1748, France regained her lost colonies. Through Madame de Pompadour, under whose influence Louis had fallen, the Jesuits were declared a society hostile to France, and in 1764 by royal edict the order was suppressed throughout the French dominions (See JESUITS). From 1769 Louis was governed by Madame du Barry, who is said to have cost the royal treasury in five years 180,000,000 livres. The Seven Years' War (1756–1763), in which France was involved, brought severe losses and humiliations on the country. At Louis's death

Louis

the country was completely demoralized and deeply in debt.

Louis XVI (1754-1793), king of France, grandson of Louis XV. In 1770 he married Marie Antoinette of Austria. He ascended the throne in 1774, on the death of his grandfather, and soon proved himself a man of honest intentions but of little ability. He could not comprehend the situation of affairs, and the reforms which he instituted were by no means sufficient to check the general discontent. A succession of incapable comptrollers-general brought matters from bad to worse, and even the popular Necker was unable to maintain order. At last, in 1789, all the grievances and discontents which had been gathering during a long period of misrule found vent; the populace attacked and destroyed the Bastille and the revolution was accomplished. In June, 1791, the position of the king had become so perilous that he attempted to escape, but he was intercepted at Varennes and forced to return. Among the events which followed were the attack of the populace of Paris on the royal palace, June 20, 1792; the king's arrest in the National Assembly, to which he had fled for refuge, and finally, his trial before the convention, where he replied to the charges with dignity and presence of mind. On January 16, 1793, he was declared guilty of a conspiracy against the freedom of the nation; on the following day he was condemned to death, and on January 21 he was guillotined.

Louis XVII (1785-1795), titular king of France, second son of Louis XVI. On the death of his elder brother, in 1789, he became dauphin, and on the death of his father he was proclaimed king by the royalists, but he was soon afterward separated from his mother and delivered to a shoemaker named Simon, a fierce Jacobin, who treated the boy with the most unfeeling barbarity. He survived this treatment only two years.

Louis XVIII (1775-1824), king of France, brother of Louis XVI, known before his accession to the throne as Monsieur. After the death of Louis XVI, Monsieur proclaimed his nephew king of France as Louis XVII, and on the death of the boy he was himself proclaimed by the émigrés, king of France and Navarre. For many years he led a wandering life, supported by foreign courts and by some friends of the House of Bourbon. He at last took refuge in England and lived there till the fall of Napoleon opened the way for him to the French throne. He entered Paris in May, 1814; he had to flee

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on Napoleon's escape from Elba, but was replaced on the throne by the allies after Waterloo. He was weak in character, but his government was most despotic.

Louis, The German, (about 805-876), the son of Louis I and founder of the German Empire. When Charlemagne's Empire was divided, Louis received Bavaria and the Slavic countries on the east frontier. By the Treaty of Verdun, 843, he acquired the whole territory east of the Rhine, and thus laid the foundation of the German Empire. In 858 he invaded France and conquered the country, but found it impossible to unite the East and West Franks, and was obliged to give up his conquest. He fought with the Normans in the Northwest, and the Bulgarians to the southeast of his dominions. In 870 he compelled Charles the Bald to sign the Treaty of Meers, by which the territories of Lothair were divided between the West Frankish and German kingdoms. At his death his empire was divided between his sons.

Louisa, *loo e' zah*, AUGUSTE WILHELMINE AMALIE (1776-1810), queen of Prussia, wife of Frederick William III. Her beauty, her dignity and her gentleness made her exceedingly popular, and her patriotic spirit in demanding that Prussia should stand firm in its opposition to Napoleon increased the love which the Prussian people bore for her.

Louisburg, *loo'is burg*, SIEGES OF, two famous sieges about the village of Louisburg, Cape Breton Island. The place had been strengthened by the French until it was considered the strongest citadel in the New World, but was taken by a British and colonial force during King George's War in 1745, the French surrendering about 1600 men. It was restored by the Treaty of Aix-la-Chapelle, but was again besieged in 1758, during the Seven Years' War, and again captured. Under British rule the fortifications were destroyed.

Louisburg is situated on the Atlantic coast of Cape Breton Island and has a fine harbor, but it has become of little importance, save as a shelter from storm. Population, 1000.

Louisiana, *loo e' ze ah' na*. the CREOLE STATE, one of the Gulf States, bounded on the n. by Arkansas and Mississippi, on the e. by Mississippi and the Gulf of Mexico, on the s. by the Gulf of Mexico and on the w. by Texas. The Mississippi River forms a portion of the eastern boundary, and the Sabine forms about two-thirds of the western. The greatest length from north to south is 280 miles, and from east

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to west, 290 miles. The area is 48,506 square miles, of which 3097 square miles are water. Population in 1910, 1,656,388, an increase of 274,763 in ten years.

SURFACE AND DRAINAGE. Louisiana is one of the lowest and most level states in the Union. The highest land consists of ridges which cross the central northern counties and nowhere exceed 500 feet in altitude. The land along the Mississippi and other rivers consists largely of flat plains, and the southern portion of the state is a gulf plain, extending inland 60 miles or more. This is cut up by lakes and lagoons and is generally swampy. Much of it has been formed by the rivers flowing into the gulf and is delta land, that formed by the Mississippi extending the farthest into the gulf. A line drawn east and west north of Lake Pontchartrain through Baton Rouge, thence a little to the southwest, practically separates this plain from the higher land, which is somewhat rolling and hilly.

No other state has so many miles of navigable water as Louisiana. The Mississippi passes through about one-half of the state and borders the other half. The Red River crosses the state from the northwest and joins the Mississippi, while the Ouachita enters near the north-eastern corner and flows southward to near the middle of the state, before joining the Red. All of these streams are navigable, while the southern part of the state is cut up by bayous, which are really broad estuaries of streams, all of which are navigable.

Louisiana contains many lakes. Those in the gulf plain on the south are really shallow arms of the sea, and their water is salt or brackish. In the interior, along the rivers, are found numerous lakes, which are really lagoons that were formerly in river channels but have been cut off by changes in river courses. Such lakes are usually in the form of arcs of a circle and are connected with streams. Along the Red River in the northwestern part of the state are numerous lakes, which have been formed from the tributaries to that stream. These have had their outlets closed by the gradual rising of the river bed through continual deposit of sediment.

CLIMATE. Louisiana has a semi-tropical climate, though, owing to the nearness of the gulf, the intense heat is modified and the climate is equable. The average temperature for January is about 60° in the southern part of the state, and about 45° in the northern, while in the summer the thermometer may rise as high as 100°.

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The coldest weather usually comes in February, and frosts occur from the first of November until the first of March; but the thermometer seldom reaches zero point. The entire state has an abundance of rainfall, averaging 60 inches in the southern half and 50 in the northern.

MINERAL RESOURCES. The mineral resources are limited. Petroleum is found in the southwestern parishes of the state, which contain an extension of the Texas oil field. The Louisiana fields now yield over 200,000 barrels a year. Rock salt is found on the island of Petite Anse, and it is also obtained from marshes along the coast. There is also a coal region, an extension of the Texas field; as far as exploited it has yielded good returns. There are also in different parts of the state deposits of limestone and gypsum, and some mineral springs produce waters valuable for their medicinal properties.

FORESTS. Louisiana contains extensive forest areas. These are found in the northern and eastern parts of the state and along the Red River. The prevailing trees are the long- and the short-leaved pine, and the swamp regions contain large quantities of cypress. Intermingled with these woods are numerous varieties of hard wood.

AGRICULTURE. The soil and climate of the state are favorable to the growth of many crops produced in semi-tropical regions, and Louisiana is the leading state of the Union in the growth of sugar cane and rice. These crops prevail in the southern part of the state, the rice fields occupying much of the swamp land west of the Mississippi. North of the region devoted to sugar cane is the area devoted almost wholly to cotton. This is the most extensive crop in the state, though its value is usually less than that of the sugar cane. Other important crops are corn, oats and fruits, which are now extensively cultivated for Northern markets. But little attention is given to the raising of live stock, though the state raises nearly all the horses and mules needed for tilling the soil.

MANUFACTURES. The refining of sugar is the leading manufacturing industry. This is followed by the making of cottonseed oil and cake and the preparation of lumber. Industries of less importance include the manufacture of tobacco products, bags, foundry and machine shop products; the raising and shipping of oysters employ a large number of people along the coast.

TRANSPORTATION AND COMMERCE. The navigable rivers enable almost all parts of the

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state to be reached by water; hence, transportation is comparatively easy and cheap. There are about 5600 miles of railway running through the state. These lines consist of trunk lines extending north and south and from the northwest to the southeast, besides an east and west line across the northern part of the state and another extending to the Pacific coast across the southern part. New Orleans is the great railroad center, and Shreveport ranks next to it in this respect. The commerce of the state consists in the export of sugar, cotton, lumber and fruit, and the importation of manufactured articles.

GOVERNMENT. The legislature consists of a senate that cannot exceed 41 members, and a house of representatives that cannot exceed 116 members. The members of each branch are elected for four years. The executive department consists of the governor, a lieutenant governor, an auditor, a treasurer and a secretary of state, each elected for four years. The judicial department consists of a supreme court, a court of appeals and district courts. The supreme court comprises one chief justice and four district justices appointed by the governor and senate for a term of twelve years. The state is divided into four supreme court districts. The court of appeals is composed of two district judges appointed by the supreme court. There are about thirty judicial districts, in which district judges hold court.

The local government of Louisiana is unique and differs very materially from that found in any other state of the Union. This is due to the fact that the state was settled by the French, who, previous to the Louisiana Purchase, had thoroughly established their laws and institutions, most of which have been retained, with but little modification. The state is divided into parishes, instead of counties, and the French civil law is authority in settling local matters.

EDUCATION. Public schools are provided for both white and colored children, and notwithstanding the difficulties with which the state has been obliged to contend since the Civil War, the schools are constantly increasing in number and are raising their standard. Cities and towns have graded schools, and the state fund is supplemented by local taxation. The state maintains a normal school at Natchitoches. The state university, with the Agricultural and Mechanical College, is located at Baton Rouge and is at the head of the public school system. Tuition is free to residents of the state. Other

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universities and colleges of importance are Tulane University, at New Orleans; the industrial institute, at Ruston; the Southwestern Industrial Institute, at Lafayette, and the Southern University for colored students, at New Orleans.

INSTITUTIONS. The state schools for the blind and deaf are at Baton Rouge. Charitable hospitals are maintained at New Orleans and Shreveport, and the asylum for the insane is at Jackson.

CITIES. The chief cities are Baton Rouge, the capital; New Orleans, Shreveport, New Iberia, Lake Charles, Alexandria and Monroe, each of which is described under its title.

HISTORY. Louisiana was first visited by Europeans about 1519, when Alvarez de Pineda and his companions entered the mouth of the Mississippi and spent six weeks on its banks. In 1541 De Soto, the Spanish adventurer, explored the coast west of Florida to the Mississippi River and visited the country on both sides of the river where New Orleans now stands. In 1682, La Salle descended to the mouth of the river, took possession of the country and named it Louisiana, in honor of his king, Louis XIV of France. The first permanent settlement was made in 1699 by d'Iberville, at Biloxi. In 1718, the charter of the Company of the West (see LAW, JOHN), was registered in the parlement of Paris, and the commerce of Louisiana was granted to it for twenty-five years. In the same year, Bienville, the governor of the colony, founded New Orleans. In 1733 France declared Louisiana a royal province, and in 1763, by secret treaty, she ceded to Spain all that portion which lay west of the Mississippi, together with the city of New Orleans and the island on which it stands. On the same day France ceded to Great Britain all the rest of her territory in America. In 1800, Napoleon restored Louisiana (including all the vast territory west of the Mississippi River) to France, and in 1803 he sold the province to the United States for \$15,000,000. Louisiana, comprising the present area, was admitted to the Union in 1812. In the War of 1812, New Orleans was attacked by the English and was bravely defended by about 5000 men under General Jackson (See NEW ORLEANS, BATTLE OF). The progress of the state from the close of this war until the Civil War was rapid. Baton Rouge became the capital in 1852. Louisiana passed the ordinance of secession Dec. 23, 1860, and in 1861 it ratified the Confederate constitution. New Orleans was occupied by

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Union forces after May, 1862, and the state suffered severely from the cessation of commerce. During the period of reconstruction, Louisiana was the scene of long-continued excitement, extending through Hayes's administration. Bloodshed was frequent. In 1868, Louisiana ratified the Fourteenth Amendment, and in 1877 a new constitution was adopted. In 1884 occurred the New Orleans Exposition, which had valuable commercial results. After a long contest in 1891, the state lottery was abolished. The state has also been concerned with the establishment of peaceful and satisfactory relations between the white and black races. Consult Phelps's *Louisiana*, in the American Commonwealths Series.

Louisiana Purchase, the purchase from France by the United States, in 1803, of the territory known as the Province of Louisiana. It was brought about by the discovery, in 1802, that Spain had ceded Louisiana to France by a secret treaty in 1800. This caused the greatest uneasiness on the part of American statesmen, since they felt that this event was merely a step in France's policy to regain its foothold in America. In order to prevent the carrying out of this plan, President Jefferson urged the purchase of the territory at the mouth of the



LOUISIANA PURCHASE
In black

Mississippi from France, in order that the Mississippi might be the boundary between the territory of the two nations. Robert R. Livingston was dispatched to accomplish this purchase and was met by a proposal on the part of Napoleon to sell the entire Province of Louisiana. An agreement was finally made by the promise of the United States to pay eighty million francs to France and to assume the debts of Americans to French citizens, amounting to twenty million francs. The agreement was signed April 30, 1803, and was ratified October 20. Though

Louisiana State University

Jefferson believed such a step was unconstitutional and at first urged the passage of a constitutional amendment, the unanimity among the people in favor of it finally led him to accept the result. The total cost to the United States, including principal, interest and debts, was about \$27,500,000. The area of the territory was 875,025 square miles, or if the Oregon country be included, more than a million square miles. It included almost all of the area that now constitutes fourteen states, whose present population is over 18,000,000, and the value of whose agricultural products alone in 1910 was \$1,900,000,000.

Louisiana Purchase Exposition, a world's fair, held at Saint Louis, Mo., in the summer of 1904, in celebration of the one hundredth anniversary of the transfer of the territory of Louisiana from France to America. The site chosen for the exposition was Forest Park, consisting of more than one thousand acres, in the western portion of the city. In this enclosure fifteen mammoth exhibition buildings were erected, arranged in the shape of a fan, the pivotal point being occupied by three domed buildings, from the center of whose base flowed a broad stream of water, which fell in cascades over a green background seventy feet in height to the grand basin below. Special care and skill were used in the distribution and designing of the buildings to produce a truly artistic scene, and the result exceeded all expectations in this respect. The total cost to the exposition company before the opening of the gates was nearly \$20,000,000, of which \$5,000,000 was donated by the United States government, \$5,000,000 by the city of Saint Louis, and \$5,000,000 by the citizens of Saint Louis. In addition, the United States government spent \$1,500,000 on its own exhibit and \$1,000,000 on the exhibit of Philippine life and products. Forty-two states were represented by buildings and special exhibits, costing more than \$7,000,000, while many of the most important foreign nations also erected buildings, at a cost of fully \$7,000,000.

Louisiana State University and Agricultural and Mechanical College, a state university, established in 1855, as the State Seminary of learning. The school was opened at Alexandria, La., in 1860, with William T. Sherman, who afterwards became one of the most prominent Union generals in the Civil War, as superintendent. During the war it was suspended, but it was revived in 1874 by the establishment of an agricultural college, which

Louis Phillippe

was temporarily located at New Orleans. Three years later this was combined with the college at Baton Rouge, and the university was chartered under its present name. It maintains courses in classics, literature, general science, mechanical and civil engineering, agriculture, including a special course in the cultivation and manufacture of sugar, and commerce. Three experiment stations connected with the university are located, respectively, at New Orleans, Baton Rouge and Calhoun. The faculty numbers about seventy, and there are about 700 students; the library contains 35,000 volumes. Most of the income is derived from state and government appropriations.

Louis Philippe, *loo e' je leep'*, (1773-1850), king of the French. He was the eldest son of Philippe, duke of Orleans, surnamed Egalité, and during his father's lifetime he was known as the duke of Chartres. He entered the army in 1791 and, favoring the popular cause in the revolution, took part in the battles of Valmy and Jemappes and distinguished himself at Neerwinden. At the Revolution of July, 1830, he was made "lieutenant general of the kingdom," and in August he became king of the French. He reigned for eighteen years, but his rule was popular with no class of people and the Revolution of 1848 drove him from the throne. He went to England, where he remained till his death.

Louisville, *loo'y vil* or *loo'is vil*, Ky., the county-seat of Jefferson co., situated on the Ohio River, 400 mi. above its mouth and 130 mi. s. w. of Cincinnati, on the Southern, the Illinois Central, the Louisville & Nashville, the Chesapeake & Ohio, the Pennsylvania, the Baltimore & Ohio Southwestern and other railroads. The city extends along the river front for over 7 miles, and its area is about 20 square miles. It is built upon a plain, which slopes gently toward the river but is sufficiently elevated to be free from danger from high water. It is connected with New Albany and Jeffersonville on the Indiana side by three bridges, varying from one-half to one mile in length. The falls in the Ohio at this place constitute a series of rapids, in which the river descends over 20 feet in the course of 2½ miles. A canal has been constructed around these falls to provide for navigation during low water. The city is regularly laid out, has wide, well-paved streets and beautiful squares. The streets contain numerous shade trees, and the residential sections are noted for their beauty, most of the houses being

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set back from the street and surrounded by fine lawns. The business portion of the city is compactly built, Main, Market, Jefferson and Fourth streets and the cross streets from First to Fifteenth being the principal business streets. There are a number of parks, the most important of which are Iroquois Park, containing over 550 acres, situated on the south side of the city, and Cherokee Park, on the east side. Shawnee Park, situated along the river bank in the west portion of the city, affords a beautiful view of the river and the opposite banks in Indiana. Near Cherokee Park is Cave Hill Cemetery, noted for its beauty and for a number of fine monuments.

The chief public buildings are the courthouse, erected at a cost of over \$1,000,000; the city hall, the customhouse, the Masonic temple, the Board of Trade building, the Commerce building, the Kentucky National Bank and the building of the *Courier-Journal*. Among the churches worthy of mention are the Roman Catholic cathedral, Christ's Church cathedral (Episcopal), the Warren Memorial church, the Second Presbyterian church, the Church of the Messiah, the Temple Adas Israel and the Broadway Baptist. Louisville is an important educational center. It has 3 medical colleges, a dental school, 2 law colleges, 3 theological seminaries, 2 schools of pharmacy and several other educational institutions. The public library contains over 50,000 volumes. The Polytechnic Society of Kentucky, a literary and scientific organization, also has a library of over 57,000 volumes, and its building contains a museum of natural history, a fine collection of paintings and one of the largest collections of minerals in the United States. The state school for the blind is also located here and has connected with it the American Printing House for the Blind (See BLIND, EDUCATION OF THE).

Louisville is an important manufacturing center. Its chief products include whisky, jeans, plows, cement, flour, farm wagons, malt liquors, furniture, foundry products and agricultural implements. Pork packing is also an extensive industry. The city is one of the chief distributing points for the southwest and has an extensive trade. It is the largest leaf-tobacco market in the world and handles fully one-third of all the tobacco raised in the United States. Its trade in pork, wheat and corn is also extensive.

The first settlement was made in 1778, and two years later it was incorporated as a town

and named Louisville, in honor of Louis XVI of France. In 1824 it was chartered as a city. During the Civil War Louisville was in sympathy with the Unionists. In 1890 it was seriously damaged by a tornado, which caused considerable loss of life and property, but the damage was immediately repaired. Population in 1910, 223,928.

Louse, the common name of a genus of insects, parasitic on man and other animals. The common louse is furnished with two simple eyes, one on each side of its head, and a mouth adapted to sucking. The legs are short, with short claws or with two opposing hooks, which give a very firm hold. The body, which is composed of eleven or twelve distinct segments, is flattened and nearly transparent. The young pass through no metamorphosis, and their multiplication is extremely rapid. Most, if not all, mammals are infested by lice.



LOUSE, MUCH ENLARGED

Louvain, *loo vaN'*, a city in Belgium, in the Province of Brabant, 18 mi. e. of Brussels, on the Dyle River. The city is well built and has some fine buildings, among which are the church of Saint Pierre and the townhall, a fourteenth century structure, one of the most beautiful examples of Gothic architecture in the world. In 1914 the Germans burned about one-fifth of the city in retaliation for alleged attacks on German soldiers by civilians (see WAR OF THE NATIONS). The fire spared the townhall but destroyed the famous University; the few scholars and professors who were not serving in the army accepted the invitation of the University of Cambridge to use its buildings and equipment as long as necessary. Louvain was famous in the fourteenth century for its cloth-making industry, which employed about 15,000 people. Civil strife ended the industrial prosperity of the city, but it was later, especially about 1600, equally famous as a center of learning, its university then having about 6000 students from all parts of Europe. Population in 1911, 42,307.

Louvre, *loo vr'*, a group of magnificent buildings in Paris, on the Seine. It was begun in 1204 and was used at various times as fortress, prison and castle. Francis I, after 1541, erected that part of the palace which is now called the *old Louvre*, and the buildings have been enlarged and adorned by successive kings, particularly by Louis XIV, until little trace of the original buildings remains. The *new Louvre*

was begun by Napoleon I, as a museum for the art treasures which he obtained from the nations he conquered, and was completed by Napoleon III in 1857. The whole group of buildings is distinguished by its great extent and by its elegant and sumptuous architecture. It contains paintings, among which are masterpieces of Murillo, Titian, Michelangelo, Delaroche, Bonheur and others; drawings; engravings; bronze antiques; sculptures, ancient and modern, together with special collections of antiquities and an ethnographic collection. It is the most extensive and varied museum in Europe.

Lovebird. See PARROT.

Lovejoy, ELIJAH PARISH (1802-1837), an American reformer, born at Albany, Maine. He graduated at Waterville College in 1826 and at Princeton Theological Seminary in 1833, and he became editor of the *Saint Louis Observer*, a Presbyterian paper, soon afterward. He soon took an active interest in the anti-slavery agitation and incurred the displeasure of pro-slavery citizens of Saint Louis. He therefore removed his plant to Alton, Ill., but it was seized and destroyed. Two other presses were also destroyed by mobs, and finally, on November 7, 1837, another mob of forty men attacked a warehouse containing a fourth press belonging to Lovejoy and guarded by several of his friends. In the mêlée Lovejoy was mortally wounded. The event caused the greatest indignation throughout the North and was the occasion of the first great anti-slavery address of Wendell Phillips.

Lov'er, SAMUEL (1797-1868), an Irish novelist, poet and artist, born in Dublin. He first devoted his attention to painting, but afterward turned to literature. He at first wrote songs and ballads, and later he published several novels, which he illustrated with his own pencil. Among his works are *Legends and Stories of Ireland*; *Rory O'More*, his most famous ballad; *Songs and Ballads*, and the novels, *Handy Andy* and *Treasure Trove*. *The Angel's Whisper* and *The Low-backed Car* are among his most popular songs.

Low, SETH (1850-), an American administrator and educator, born in Brooklyn, N. Y. He was educated at Brooklyn Polytechnic Institute and Columbia College. He began his business career as a clerk in his father's store, where he rose to the position of partner. He early manifested an interest in public affairs and was the organizer and first president of the New York Bureau of Charities. In 1881

Lowell

Mr. Low was elected mayor of Brooklyn on an independent ticket, and was reelected for a second term. His administration was characterized by a radical reform in all departments of city administration, and, especially, by the advancement of the public schools. In 1889 he was elected president of Columbia College, and during his administration the work of the institution was thoroughly reorganized and placed on a university basis, the college was located on its present site and its name was changed to Columbia University. He was appointed one of the members of the United States delegation to the Hague Peace Conference, and from 1902 to 1903 he was mayor of Greater New York on an independent ticket. His administration was characterized by extensive reforms in the financial and police departments.

Lowell, lo'el, MASS., one of the county-seats of Middlesex co., about 25 mi. n. w. of Boston, on the Merrimac River at the mouth of the Concord and on the New York, New Haven & Hartford and several lines of the Boston & Maine railroads. Some of the features of interest are the Fort Hill Park, the Ladd-Whitney Monument, the Pawtucket Falls and the Rogers Street stone bridge. The Lowell Textile School, the state normal school, Rogers Hall School, Notre Dame Academy and other schools are located here. There are also various charitable institutions, a large public library and several churches.

The Merrimac River has a fall of thirty-two feet at this point, and the Canal and Lock Company completed the first system of canals in 1825. These have since been improved and well equipped with locks and bridges. The first mill was erected in 1823, and the city is now widely known for its-textile manufactures. The principal products are cotton, woolen, worsted goods, hosiery, felt, carpets and foundry products. Lowell was founded in 1822 by the Merrimac Manufacturing Company. The settlement grew rapidly, was incorporated as a town in 1826 and was chartered as a city ten years later. Population in 1910, 106,294.

Lowell, ABBOTT LAWRENCE (1856-), an American educator, born in Boston and educated at Harvard University and Harvard Law School. From 1880 to 1897 he practiced law in Boston; from 1897 to 1899 he was lecturer on government at Harvard and in 1900 he was appointed Professor of the Science of Government. In 1909 he was chosen President of Harvard to succeed President Eliot. President Lowell is

Lowell

known for his broad scholarship and his administrative ability. Many eminent scholars attended his inauguration. He is the author of *Government and Parties of Continental Europe* and *The Government of England*.

Lowell, JAMES RUSSELL (1819-1891), America's most representative man of letters,



JAMES RUSSELL LOWELL

great as poet, critic, essayist, orator and diplomat. He was born at "Elmwood," Cambridge, February 22, 1819, and his ancestors were among the earliest and most eminent settlers in New England. His early education came not so much from his work in school as from his reading and his out-of-door rambles. When he was sixteen years old he entered Harvard University, and while here it is said that he read everything except his text-books; certain it is that he almost failed to get his degree. He did graduate, however, in 1838 and then studied law for three years, after which he was admitted to the bar in Boston. This profession was uncongenial to him; and it is uncertain whether he ever had any clients. He soon gave it up and determined to devote himself to literature, and in 1843 he helped to found a monthly magazine, *The Pioneer*. Hawthorne, Poe and Whitier were also contributors to this periodical, but it did not meet with success.

As a college student Lowell had written verse, and at his graduation he wrote the class poem. His first serious attempt at poetry, however.

was a volume of love lyrics inspired by Maria White, whom shortly afterward he married. She induced him to use his genius in promoting the cause of freedom, and the result was the first series of the famous *Biglow Papers*, published in 1848. In this same year he published *The Vision of Sir Launfal*, his best-known poem, and the *Fable for Critics*, which, in spite of its frolicsome tone, shows much real critical power. In 1855 Lowell was appointed to succeed Longfellow as professor of modern languages at Harvard, and he spent two years abroad preparing for the duties of that position. In 1857 was founded the *Atlantic Monthly*, of which Lowell was the first editor, and he was also during the years that followed a frequent contributor to the *North American Review*. Lowell's first wife died in 1853, and he married four years later Miss Frances Dunlop, with whom his life was very happy.

Meanwhile, his writings had brought him before the public as an independent supporter of the Republican party, and in 1876 he was made a presidential elector. In the following year he was appointed by President Hayes minister to Spain, and three years later he was transferred to England, where he remained until 1885. During this service he did much toward bringing the American and British people together. He was very prominent and exceedingly popular while in Great Britain. Lowell's wife died in the year that he returned to America, and he himself died six years later, in the old family mansion "Elmwood," where he was born and where he had lived most of his life.

Besides the works mentioned above, Lowell produced a second series of *Biglow Papers*, dealing with the Civil War; *The Commemoration Ode* to the Harvard graduates who died during the war, which is one of the most beautiful poems of its kind ever written; *Under the Willows*, a volume of verse issued in 1869 and containing many of his best poems; *The Cathedral*, his longest poem, which is of very uneven merit and into which he introduced, in the midst of the most serious passages, prankish humor. The chief elements which make Lowell's poetry great are its sound common sense and its vigorous expression. It is not evenly beautiful, as is that of Longfellow, and it is, like his prose work, often so crowded with literary references and allusions as to be difficult reading. Among his chief prose works are *Fireside Travels*, which abounds in pleasant fancy; and *My Study Windows* and *Among*

My Books, two volumes of criticisms which show that he is entitled to rank with the best of American critics. Consult biographies by Underwood, Edward Everett Hale and Horace E. Scudder. See READING, Volume V.

Lower California. See CALIFORNIA, LOWER.

Low German. See PLATTDEUTSCH.

Lowndes, lownds, WILLIAM (1782-1822), an American statesman, born in Colleton County, S. C., educated in England and admitted to the bar in 1804. He became a planter, however, was elected to the South Carolina legislature as a Jeffersonian Republican and entered Congress in 1810. There he attained prominence as an opponent of the administration during the War of 1812 and as chairman of important committees. In 1821 he was nominated for the presidency by the legislature of his state, but received only scattering support. His health failing, he sailed for Europe in October, 1822, and died at sea. During his term in Congress he gained the esteem of the greatest of his contemporaries, including Henry Clay, who once said that he was the wisest man he ever knew.

Loyo'la, IGNA'TIUS OF (1491-1556), original name, Inigo Lopez de Recalde, the founder of



IGNATIUS OF LOYOLA

the order of the Jesuits, was born at the castle of Loyola, Guipuscoa. When still a young

man, he entered the army, and during the defense of Pampeluna in 1521 against the French, he was severely wounded, and a long and tedious confinement was the result. The only books he found to relieve its tedium were books of devotion and the lives of saints. This course of reading developed in him a state of devotion in which he renounced the world, made a formal visit to the shrine of the Virgin at Montserrat and vowed himself her knight. After his dedication he made a pilgrimage to Rome and Jerusalem; then he attended the schools and universities of Barcelona, Alcalá and Salamanca. On completing his studies he went to Paris, where he went through a seven years' course of general and theological training. Here, in 1534, he formed the first nucleus of the Society of Jesus, or Jesuits, which afterward became so famous. François Xavier, professor of philosophy, Lainez and others, in conjunction with Loyola, bound themselves together to devote themselves to the care of the Church and the conversion of infidels. Rome ultimately became their headquarters, and Loyola submitted the plans of his new order to Pope Paul III, who, under certain limitations, confirmed it in 1540. Loyola continued to reside in Rome and governed the society he had constituted till his death. He was beatified in 1607 by Paul V and was canonized in 1622 by Gregory XV. See JESUITS.

Lub'bock, JOHN, Sir, Baron Avebury (1834-1913), a British scientist and statesman, born at London and educated at Eton College. In 1848 he joined his father, Sir John William Lubbock, a famous astronomer and mathematician, in the banking business, and in 1856 he became a full partner in the firm. In this profession he became conspicuous and held many responsible positions under the government, in connection with financial and educational affairs. In 1870 he was elected as a Liberal to Parliament, and with the exception of a brief period he continued to be a member until 1900. During the latter years of his service he acted with the Liberal Unionists. Upon retiring from Parliament, he was made a peer, as the first baron of Avebury. Besides being responsible for the passage of many important financial and educational measures, he won distinction as an archaeologist and anthropologist. He published many volumes, of which the most important are *Prehistoric Times*; *Origin of Civilization*; *Ants, Bees and Wasps*; *Flowers, Fruits and Leaves*; *The Senses, Instincts and Intelligence of Animals*; also several volumes of

essays, of which the best known are *The Pleasures of Life*, *The Beauties of Nature* and *The Use of Life*. By his clear description and explanations of scientific principles he did much to popularize the study of science, especially in England.

Lü'beck, one of the three city-states of the German Empire. It stands on a low ridge at the junction of the Wakenitz with the Trave, 36 miles northeast of Hamburg and 10 miles from the Baltic. The manufactures are comparatively unimportant, but the trade is extensive, especially with Hamburg, the Baltic ports and the interior of Germany. Lübeck possesses a territory of 115 square miles and includes several isolated portions of Holstein and Lauenburg. It has a senate of 14 members and a council of burgesses of 120 members. It became an imperial free city in 1226, and about thirty years later it became the head of the Hanseatic League. Population in 1910, 98,656; of the territory, 116,599.

Lucayos, *lu ki'yose*. See BAHAMA ISLANDS.

Luc'ca, a city of Italy, in the Province of Lucca, Tuscany, 15 mi. n. e. of Pisa. The city is surrounded by fortifications, and most of the architecture is medieval. Among the chief buildings are the churches, the Romanesque Cathedral of San Martino, the Basilica San Ferdinando and the Palazzo Provinciale, formerly the residence of the dukes. On the remains of a large Roman amphitheater stands the city market. There are two academies of science, literature and art in Lucca, and the city contains four libraries. It is especially famous for its manufactures of silks, velvets and other textiles, and there are also foundries and glass and paper factories. Lucca was first an Etruscan town and was taken in 177 B.C. by the Romans, who made it into a colony. After the fall of Rome it was owned by the Ostrogoths, the Lombards and the Franks, successively. Before the rise of Florence, Lucca was a very important town, but later declined, being weakened by the contests between the Guelphs and the Ghibellines. By the Congress of Vienna it was given to Maria Louisa, the Spanish infanta, and her son Charles Louis. In 1847 the duchy united with Tuscany, and together they became a part of united Italy in 1860. Population in 1911, 76,160.

Lucerne or **Lucern**, *lu'surn*. See ALFALFA.

Lucerne, *loo'surn'*, a city of Switzerland, capital of a canton of the same name, situated on the margin of Lake Lucerne. It is a very

popular tourist resort on account of the beauty of the surrounding country and the picturesque-ness of the city itself. There are several ancient buildings, an arsenal with old armor, a gallery of art, a museum of antiquities and numerous interesting modern buildings. One of the chief points of interest is the famous Lion of Lucerne (See SWISS GUARDS). Population in 1910, 39,152.

Lucerne, LAKE OF (German, *Vierwaldstatter See*, or Lake of the Four Forest Cantons), a Swiss Lake, bounded by the cantons of Uri, Schwyz, Unterwalden and Lucerne, and noted for its magnificent scenery and historical associations. It is nearly in the shape of a cross, the bays of Lucerne, Küssnacht and Alpnach forming the head and arms, while the foot is formed by the bay of Buochs and the lake of Uri. Its length from Lucerne to Flüelen is 23 miles; from Alpnach to Küssnacht, at the extremities of the arms, about 14 miles; its width is from $\frac{1}{2}$ to 2 miles, and its greatest depth is 700 feet. It is a favorite resort for tourists.

Lu-Chu. See LOO-CHOO.

Lucian, *lu'shan* (about 120—about 200), a Greek satirist and humorist. Little is known of his life, but he is said to have made money as a rhetorician or a lawyer, to have spent much time in traveling and to have lived for long intervals in Athens. Those of his works which are still in existence are critical, satirical, rhetorical and narrative, and they are mostly in the form of dialogue. The most popular are those known as *Dialogues of the Gods* and *Dialogues of the Dead*. Lucian stands as one of the world's greatest prose writers and as the wittiest of the ancients.

Lucifer, *lu'se fur*, (in Greek, *Phosphoros*, meaning *light-bearer*), a name anciently given to the planet Venus, as the morning star. The term is used figuratively by Isaiah (xlv, 12) and is applied to the Babylonian king, but it was mistaken by the commentators for a reference to Satan.

Lucilius, *lu sil'i us*, CAIUS (148–103 B. C.), a Roman poet, grand-uncle to Pompey the Great. He is considered the inventor of Roman satire, because he first gave it the form under which it was carried to perfection by Horace, Juvenal and Persius. Of thirty satires which he wrote, only some fragments have been preserved.

Luck'now or **Lakhnau**, a city of British India, capital of Oudh, 540 mi. w. n. w. of Calcutta. It ranks fourth in size among British

Indian cities, being next after Calcutta, Madras and Bombay. Although its streets are narrow and dirty and many of its buildings are small and mean, the city is from a distance picturesque and imposing in appearance, as there are minarets and domes on many of the larger buildings. Lucknow was one of the chief scenes of the Sepoy mutiny in 1857. At the beginning of the mutiny the residency was fortified by Sir Henry Lawrence, and after his death it was closely besieged by the rebels till relief was brought by Havelock and Outram. The relieving force was only a small one, however, and the British were again besieged. In the middle of October, Sir Colin Campbell gained possession of the place after severe fighting and made it possible for the garrison to leave the city. In March, 1858, the British permanently recovered the town. Population in 1911, 259,798.

Lucretia, *lu kre'she ah*, in Roman legendary history, the virtuous wife of Tarquinius Collatinus, who was outraged by Sextus, son of Tarquinius Superbus, king of Rome. After telling her husband and father of her wrong, she stabbed herself, and her death was the signal for a revolution, by which the Tarquins were expelled from Rome and a republic was formed.

Lucretius, *lu kre'she us*, TITUS CARUS (about 99—about 55 B. C.), a Roman philosophic poet. About his life almost nothing is known, but he is said to have died by his own hand. He is admitted to be one of the greatest of Roman poets for descriptive beauty and elevated sentiment. We possess a didactic poem of his composition, in six books, *De Rerum Natura* (On the Nature of Things).

Lucullus, *lu kul'lus*, LUCIUS LICINIUS (about 110–57 B. C.), a Roman naval and military commander. He distinguished himself greatly in his campaigns against Mithridates, king of Pontus, from the time of Sulla to 66 B. C., when he was supplanted by Pompey. He thenceforward lived in luxurious retirement on the coast of Campania. His house, which contained a valuable library and works of art, was freely opened to learned men and philosophers.

Lud'ington, MICH., the county-seat of Mason co. 105 mi. n. w. of Grand Rapids, on Lake Michigan, at the mouth of the Marquette River, and on the Pere Marquette and several other railroads. The manufacturing and shipping of lumber are the principal industries, and there is also a large trade in grain, fruit and salt. The manufactures include game boards, furni-



LUMBER

1, Lumber Camp.
2, Log Train.

3, Log Pile by Lake.

4, Felling Trees.
5, Lumber Yard and Mill.

Ludlow

ture and clothespins. The city is in a beautiful lake region affording good fishing, and it has become a popular summer resort. The grounds and cottages of the Epworth League assembly are at Epworth Heights, near the town. Ludington was settled in 1851 and was chartered as a city in 1874. Population in 1910, 9132.

Lud'low, WILLIAM (1843-1901), an American soldier, born at Islip, Long Island, educated at West Point Military Academy. He served in the Georgia campaign in 1864, was assistant engineer to Sherman's army during the march to the sea and was brevetted major and lieutenant colonel for gallantry. From 1872 to 1876 he was chief engineer in the Black Hills and Yellowstone expedition, and he held many other important positions. He took an active part in the Spanish-American War, commanded the right wing at Santiago and was made military governor of Havana. In December, 1899, he was ordered to the Philippines, but was obliged to return on account of ill health.

Ludwigshafen, *lood'viKs hah'fen*, a Bavarian town in the Palatinate, across the Rhine from Mannheim. Although the chemical works constitute the chief industry of the town, there are, besides, manufactures of vinegar, spirits, wagons, machinery and artificial flowers. Population in 1910, 83,301.

Luke, SAINT, the evangelist, author of the Gospel which bears his name and of the *Acts of the Apostles*. He was probably born at Antioch, in Syria, and was taught the science of medicine. He is supposed to have been one of the seventy disciples and was also one of the two who journeyed to Emmaus with Jesus after the resurrection (*Luke* xxiv, 13-35). He was for several years a companion of the apostle Paul in his travels, so that in the *Acts of the Apostles* he relates what he himself had seen and participated in.

Lumba'go, rheumatism or rheumatic pains affecting the muscles of the loins. The disease is caused usually by colds and exposure and is likely to recur after the first attack and may even become chronic. The pains may be sharp and intermittent or dull and steady. The attack lasts from a few hours to several weeks and often disables and weakens the sufferer for longer periods. Warmth and rest constitute the best treatment. Pressure upon the affected muscles often gives relief.

Lum'ber, timber manufactured for building purposes. The most important forms in which lumber exists are logs, telegraph poles, boards,

Lumber

planks, joists, shingles, railroad ties and lath. Its manufacture constitutes one of the most important, as well as one of the most extensive, industries of the world. The leading lumber-producing countries are the United States, Canada, Sweden, Russia, Germany and France. India, the Chinese Empire and the Kongo region also produce lumber in large quantities.

In some of the lumber regions of the United States the cutting of timber is carried on only during the winter months, because it is at this time that the logs can be more economically transported than at other seasons. The lumbermen during the logging time live in camps, which are usually constructed of logs and consist of buildings in which the men sleep, a kitchen and dining room, one or more stables for the horses, and a blacksmith shop. The men of the camp are organized into squads, each in charge of a foreman and assigned to a special line of work. One squad fells the trees, which is done by sawing them off near the ground, instead of chopping them, as formerly. Another squad cuts trees into logs; still another hauls the logs to the river or to another suitable place, from which they are transported to the mills, while another may have charge of the roads over which the logs are hauled. The general foreman, or superintendent, has oversight of all the work, selects the trees to be cut and sees that each squad performs the work assigned to it in a satisfactory manner.

Formerly the logs were hauled to the nearest stream or lake, from which they were carried with the high water down the river to the mills, but as the timber near the streams was cut off, it became more economical to employ railways for transporting the logs, so that now they are often loaded directly upon cars constructed for the purpose and hauled to their destination. Because the manufactured lumber can be transported more cheaply, steam sawmills are usually erected in the midst of the lumber region, and the logs are worked up near where they are cut. Transportation by raft is used to some extent on the Great Lakes and on the Pacific Ocean. Logs are bound together in large rafts, usually rectangular in form and longer than they are wide. These are towed by tugboats or steamers. This method of transportation is convenient and inexpensive, and when the lumber is cut near the water, it can be used very effectively.

The important lumber regions of the United States are in Maine, northern Michigan, Wisconsin and Minnesota, around the Great Lakes,

Lumpfish

in the forest regions of North Carolina, Georgia, Tennessee and Arkansas, and in Washington, Oregon and the northern part of California. Because of the immense size of the trees in the last-named region, the methods employed vary greatly from those in the other regions. Here horses or oxen are of but little use in moving logs, and hoisting engines, traction engines and railways are very generally employed for the purpose of moving the logs and for transporting them to the mills. Some of the trees are of such size that the logs have to be split into blocks before they can be sawed.

The sawmills contain all the machinery necessary for working the logs into the finished lumber. Circular saws, band saws and gang saws are common in the largest mills (See SAW). The gang saw consists of a number of saws attached to an iron frame which moves up and down. The space between the saws is the same as is desired for the thickness of the board or plank to be cut, and each gang contains enough saws to convert the log into lumber as it passes through them. While a mill of this pattern seems to work slowly, yet because of the number of saws employed it manufactures more lumber in the same time than any other mill. All of the waste product is used. The slabs and poor boards are cut into lath; the bark, sawdust and other waste go to feed the fire in the boiler, so that practically nothing is wasted. Since lumber shrinks in drying, it must be thoroughly seasoned before it can be used, and many large mills contain drying kilns, or chambers in which the boards are stacked and subjected to the influence of hot air for a number of days. Some mills also contain planing mills and other finishing machinery, so that the lumber can be manufactured into any desired article before leaving the mill.

Lumbering is the third industry in importance in the United States, and the value of the lumber produced in the country yearly is about \$1,150,000,000. The industry gives employment to nearly 700,000 men. The leading states in order are Washington, New York, Louisiana, Michigan, Wisconsin and Pennsylvania. See FORESTS; OAK; PINE; MAPLE; INDUSTRIES, Vol. V.

Lumpfish or **Lump sucker**, a fish, so named from the clumsiness of its form. The back is arched and sharp, the belly flat, the body covered with numerous bony tubercles and the ventral fins modified into a sucker, by means of which the fish can stick firmly to anything. Before the spawning season it is of a brilliant

Lunar Caustic

crimson color, mingled with orange, purple and blue, but afterward it changes to a dull blue or lead color. It sometimes weighs seven pounds, and its flesh is very fine at some seasons, though insipid at others.

Lumpy Jaw or **Lump Jaw**, a disease of cattle, usually manifested by the appearance of swellings on the lower jaw, though it affects other parts of the body. It is caused by a fungus which is found on grasses and on the awns of barley, spears of oats and other grains. These occasionally penetrate the gums of cattle, and the fungus lodges in the tissue and grows, producing tumors or abscesses. When opened and examined, these are found to contain minute grains, varying in color from pale yellow to a sulphur yellow. These granules are imbedded in the soft tissue composing the tumor or in the pus of the abscess. The presence of the fungus causes sufficient irritation to propagate these inflammatory growths. The disease progresses rather slowly, but unless checked it often produces ulceration of the jawbone, causing displacements or even loss of teeth. Without assistance the animals seldom recover.

It is supposed that the disease is contracted from food infected with the fungus. The treatment consists in lancing or removing the tumors and also in treating with solutions of iodide of potassium and iodine. The latter method is usually the more effective and has the advantage that it can be applied by any one, while the surgical operation can be undertaken only by a trained veterinarian.

Lu'na, the Latin name for the moon, known to the Greeks as *Selene*. Her worship is said to have been introduced among the Romans in the time of Romulus.

Lunacy, *lu'na sy*. In law, "a lunatic," says Blackstone, "is one that hath had understanding, but by disease, grief, or other accident, hath lost the use of his reason." In the United States, the legislature exercises a protective authority over idiots and lunatics. The statutes of the different states provide that such persons may be put under guardianship, provided lunacy is proved before a competent court. Until the contrary is shown, every man is presumed to be sound of mind. In criminal cases lunatics are not chargeable for their acts, but they may be sued and can sue, in the name of their guardians, for civil wrongs. See INSANITY.

Lu'nar Caus'tic, a chemical preparation, composed of nitrate of silver, mixed with a little nitrate of potassium or silver chloride, and made

Lundy

into little sticks, which are white or grayish in color and turn black on exposure to the air. Lunar caustic is used extensively in surgery, because of its antiseptic qualities and its power to burn away diseased tissue or such formations as the membrane in diphtheria.

Lun'dy, BENJAMIN (1789-1839), an American abolitionist of Quaker extraction, born in Suffolk, N. J. At the age of nineteen he emigrated to Ohio, where he soon became an opponent of slavery and the methods of its advocates. There he organized the Union Humane Society, and after spending a short time in Missouri he founded at Mount Pleasant, Ohio, the *Genius of Universal Emancipation*. This he removed finally to Baltimore, Md., where it gained wide influence as an anti-slavery organ. He was joined in editing the paper in 1829 by William Lloyd Garrison. The latter's views were more radical than Lundy's and soon brought the paper into disrepute among conservative abolitionists. The partnership was dissolved, and Lundy removed his office to Washington, where the paper soon failed. Lundy started the *National Inquirer* in Philadelphia in 1836, but retired from its management two years later. He also lost most of his property at the hands of a mob in Philadelphia and removed to Lowell, Ill., where he reestablished the *Genius of Universal Emancipation*, but died within a few months.

Lun'dy's Lane, BATTLE OF, an important battle of the War of 1812, fought at Lundy's Lane, about one and a half miles from Niagara Falls on the Canadian shore, July 25, 1814. The American force was commanded first by General Scott and then by General Jacob Brown and faced a superior force under General Reall. The Americans were the aggressors and first gained an important advantage, but the result after an all-day's struggle was probably a drawn battle. The loss on each side was about 850.

Lungs, THE, organs of respiration, which occupy, in man, the greater part of the cavity of the chest and are separated from each other by the oesophagus, the heart and the large blood vessels. Though these organs occupy so large a space they are the lightest, according to size, of any in the body, weighing in man about three and one-half pounds, in woman two and three-fourths pounds. The color varies with the age of the individual, being pinkish at birth, slate colored and mottled in adult life and of a still darker tint in old age. Each lung is partially subdivided into lobes, the right into three, the

Luray Cave

left into two, and each lobe is made up of a large number of tiny lobules, each minute part consisting of bronchial tubes (See BRONCHI), pulmonary lobules, blood vessels, lymphatics and nerves imbedded in fibrous and elastic tissue. The root of the lung is the place where the bronchial tubes and blood vessels enter it, at about the middle of the inner surface. The minute terminal branches of a bronchial tube widen out, and the folds of their walls make the air cells. A dense network of capillaries lies outside the cells, so that between the air in the cells and the blood in the capillaries there are but the two very thin walls, and often there is only a single layer of capillaries between adjoining cells, thus exposing both sides of the blood vessels to the air. The blood vessels of the lung belong to two distinct systems, the *bronchial*, which give nourishment to the lung proper, and the *pulmonary*, which expose the venous blood to the lungs for its arterialization. The pulmonary artery carrying venous blood from the heart to the lungs divides under the arch of the aorta, enters the root of the lungs with the bronchi, divides and subdivides, following the divisions of the bronchi, and finally forms the capillary network before mentioned. The blood, while passing through these capillaries, is changed to pure arterial blood. It is then conveyed through the converging pulmonary veins to the left auricle of the heart. See CIRCULATION; PLEURA, RESPIRATION.

Lungwort, *lung'wurt*, a common garden flower which has red and purple tubular blossoms and leaves speckled like diseased lungs. It was formerly believed to be valuable as a remedy in diseases of the lungs. A kind of hawkweed and a lichen receive the same name.

Lu'perca'lia, a Roman festival, celebrated annually in honor of Lupercus, an ancient pastoral god, afterward identified with Pan. It was celebrated on February 15 at the Lupercal, a grotto in the Palatine Hill at Rome. Goats were sacrificed, and two youths, arrayed in goat skins, ran through the streets of the city striking with leather thongs all the persons they met.

Lu'pine, a very extensive genus of hardy plants, some of which are cultivated in gardens for the sake of their gaily-colored flowers.

Luray' Caverns, a series of underground galleries in Page County, Va., near Luray. Most of the hundreds of chambers have not yet been explored. The cave is considerably smaller than the Mammoth Cave of Kentucky, as it

Lurcher

underlies only about 100 acres, but it affords a wonderful display of stalactites.

Lurch'er, a very intelligent dog that lies in wait for small game, such as hares, rabbits and partridges, drives them into nets, runs them down or seizes them. This species of dog is said to be descended from the shepherd's dog and the greyhound, and in England, where it is best known, it is more used by poachers than by sportsmen.

Lute, a stringed musical instrument, similar to a guitar, formerly very popular in Europe. It consists of four parts, namely, the table or belly, with a large round hole in the middle; the body, ribbed like a melon, with nine or ten ribs, or divisions; the neck, which has nine or ten stops, or frets, which divide the strings into semitones; and the head, or cross, in which are fitted the pegs, or screws, for tuning the strings, of which there are five or six pairs, each pair tuned in octaves or in unison. The strings are struck by the fingers of the right hand and are stopped on the frets by those of the left.

Luther, MARTIN (1483-1546), a German reformer, born at Eisleben, Saxony. He was of poor parentage, his father being a miner. When but twenty years of age he graduated as master of philosophy at Erfurt in Thuringia; in 1505 he entered the monastery of the Augustinians at Erfurt and two years later was consecrated priest. The following year, by the influence of his patron, Staupitz, who was district vicar of the order, Luther was made professor of philosophy in the new University of Wittenberg. At first he lectured upon the philosophy of Aristotle, but soon turned his attention to the Bible, and his lectures on this subject attracted so much attention that Staupitz prevailed upon him to preach regularly in the monastery church at Wittenberg. In 1512, upon his return from a visit to Rome in the interests of his order, he was made doctor of theology and began his famous lectures on Paul's *Epistles*. His first original work, the *Exposition of the Seven Penitential Psalms*, was published in 1517. Meanwhile, he had been made district vicar of the Augustinians and then preached not only in the convent chapel, but also in the parish church.

During these years he had worked zealously for the Church and in the interests of his order, but in 1517 a Dominican priest, Johann Tetzel, appeared in the vicinity of Wittenberg, selling indulgences, the proceeds of which were to go toward the building of Saint Peter's. Just at

Luther

this time the dedication of the Schloss-kirche was being celebrated at Wittenberg, and, as it was customary upon such days to nail upon the church doors bulletins of general interest to the parish, Luther on the evening before the fête-day published upon the door of the Schloss-kirche his ninety-five theses, which led to the movement known as the Protestant Reformation. These theses were called forth by Tetzel's abuse of the church doctrine regulating indulgences. Their tone was, however, moderate, and it seems that at this time Luther contemplated no break with the Church. By means of the press, the theses were scattered with remarkable rapidity through Europe, and all the continent was soon plunged into a tumult of controversy. Luther, meanwhile, devoted himself to the further study of the Bible, Church history and canon law, in order to defend the position he had taken. His study resulted in his drifting further and further from the Church. His public utterances and writings became bolder, and he was soon attacking the entire system and body of teachings of the Church of Rome. At first the pope did not regard the matter as of serious import; but at length, being convinced that Luther's influence was becoming dangerous, he issued a bull against him and his friends. Luther's writings were condemned as heretical, and he himself, if he did not recant his errors in sixty days, was to be seized and sent to Rome to be tried for heresy. Luther publicly burned this communication.

In 1521 the Diet of Worms, an assembly of the princes, nobles and clergy of Germany, was convened by the emperor Charles V to deliberate upon State affairs in general and especially upon matters touching the great religious controversy. Luther was summoned before this body and called upon to recant his errors. Refusing to do so, he was pronounced a heretic and outlaw, but was allowed to depart in safety. Frederick, elector of Saxony, conveyed him privately to the Wartburg castle, where he remained for ten months in seclusion and translated the New Testament into German. Meanwhile, serious troubles arose from the excesses of some professed followers of Luther. Castles and monasteries were sacked, and horrible outrages were perpetrated. Although a legal outlaw, Luther now came forth, temporarily checked the disturbance, then resumed his work in the Church and university; and when several years later trouble broke out afresh, he made a tour through the neighboring towns, preaching a

crusade against the image breakers. His history from this time is identical with that of the Reformation. It is thought that the rapidity with which his doctrines gained ground was due as much to his hymns as to his preaching. *A Mighty Fortress is Our God* is sometimes known as the "battle hymn of the Reformation." In 1524 Luther married Katharine von Bora, a former nun, who for several years had been a believer in his doctrines. In the same year he established a school at Eisleben. From 1526 to 1529 he was engaged in the preparation of a new church service. His translation of the Bible in 1534 permanently established the literary language of Germany. The life of Luther after the drawing up of the Augsburg Confession contains little of interest. See REFORMATION. Consult E. H. Jacobs's *Life of Luther*.

Lu'therans, the name given in derision by the opponents of the Reformation to those who adopted the theological doctrines of Luther. Luther himself protested against this name, as his intention had been, not to form a new Church, but to reform abuses in the Church then existing. The Augsburg Confession set forth the doctrines which are held by the Lutherans of to-day (See AUGSBURG CONFESSION). The Lutheran creed includes the doctrines of "justification by faith alone, universal depravity, the vicarious atonement, regeneration, progressive sanctification, a true sacramental, but not a material, presence of Christ in the Lord's Supper, and the use of both the Bible and the sacraments as means of grace." Lutheranism is the prevailing form of Protestantism in Germany and is the national religion of Denmark, Sweden and Norway.

Lü'tzen, **BATTLES OF**. The first Battle of Lützen was fought in November, 1632, between the Swedes, under Gustavus Adolphus, and the imperial troops, under Wallenstein. The Swedes, although they had the smaller force, were victorious after a stubbornly-fought battle, but Gustavus Adolphus was killed. On May 2, 1813, occurred the second Battle of Lützen, in which Napoleon defeated General Wittgenstein with a force of Russians and Prussians. The loss to each side was approximately 20,000.

Luxembourg, *looks'ahN boor'*, **Palace**, a beautiful building in the southern part of Paris, celebrated for its elegant architecture. It was built in the first part of the seventeenth century, but has been since that time changed very considerably, though the original style and character have been preserved. Since 1879 it has been used as the Senate building, and besides this it

has served as a royal or public picture gallery. It has now the largest and most important collection of modern art, both sculpture and painting, which is contained in a small neighboring building called the Museum of Luxembourg. The palace is French in design, though modeled after the Pitti Palace in Florence. The walls and ceiling decorations are magnificent, and the rooms are adorned with beautiful paintings, the masterpieces of many great artists. The Luxembourg gardens, the most noted gardens in France, are large and beautiful and are used as a public park.

Lux'emburg, an independent grand duchy of Europe, bounded on the n. and e. by Rhenish Prussia, on the s. by Lorraine and France and on the w. by Belgium. It is about 998 square miles in area. Grain, fruit and wine are produced, cattle and horses are exported and iron ore is mined and smelted. The inhabitants are mostly of German origin, but French is the language of the educated classes and of business. The capital of the duchy is Luxembourg. Luxembourg is a member of the German zollverein. Its independence was guaranteed by the European powers in 1867. In 1914 it was invaded by a German army. See WAR OF THE NATIONS.

Lyceum, *li se'um*, an academy at Athens, in which Aristotle explained his philosophy. In modern times the name *lyceum* has been given to the schools intended to prepare young men for the universities, also to organizations which maintain lecture courses of a popular or technical nature.

Lycia, *lish'eah*, an ancient maritime province, in the southern part of Asia Minor. It was colonized by the Greeks at a very early period, and its historical inhabitants were Greeks, though with a mixture of aboriginal blood. Lycia was conquered in the sixth century B. C. by Persia and was afterward in turn ruled by Macedonia, Egypt, Syria, Rome and Turkey.

Lycurgus, *li kur'gus*, the great lawgiver of the Spartans, who flourished about 900 B. C. He traveled into Crete, Egypt and Asia and thus prepared himself to give Sparta the laws which have rendered his name immortal. His object was to regulate the manners, as well as the government, and to form a warrior nation, in which no private interest should prevail over the public good. See SPARTA.

Lyd'ia, in ancient geography, a large and fertile country of Asia Minor. It attained its highest prosperity in the seventh and sixth centuries B. C., especially under Croesus, who was

conquered by the Persians under Cyrus, in 546 B. C. The Lydians are credited with the invention of certain musical instruments, the art of dyeing wool and the art of smelting and working ore. Sardis was the capital of Lydia.

Ly'ell, CHARLES, Sir (1797-1875), a British geologist, born at Kinnordy, Scotland. He was educated at Oxford and began the study of law, but afterward resolved to devote his time and fortune to geological research. For this purpose he visited the continent of Europe and the United States. His first important work was the *Principles of Geology*, and a portion of this book afterward formed the basis of the *Elements of Geology*. Another important work was the *Antiquity of Man*, in which he summarized the evidence in favor of the theory that the race of man was much older than was currently believed. Lyell is considered by many to be the founder of modern geological science.

Lymph, *limf*, a colorless, nearly transparent fluid, found in the lymphatics. It has a saltish taste and, on examination with the microscope, is seen to contain corpuscles resembling quite closely white blood corpuscles. The composition of lymph seems to be almost the same as that of the blood, with the exception that it does not contain any of the coloring matter found in blood. Lymph is absorbed by the *villi* of the small intestines, passes through the lacteals into the *receptaculum chyli* and thence into the thoracic duct. Its function is to provide nourishment for the growth and repair of the tissues, as well as for the storage of energy. The formation of lymph is continuous, and it is absorbed by the tissues from the capillaries. Physiologists suppose that the amount formed is regulated to some extent by the pressure in the lymphatic vessels and that this pressure is controlled by the absorption by the tissues. See **LACTEALS**; **LYMPHATICS**.

Lymphatics, *lim fat'iks*, minute, transparent tubes, which originate in lymph capillaries, found in all parts of the body except the brain, eye, spinal cord and tendons. They are so abundantly supplied with valves that when filled with lymph they present a beaded appearance. In the course of these lymphatics are glands, through which the lymph passes on its way to the blood vessels of the neck. The valves are abundant in the armpit and the groin, along the great vessels of the neck, thorax and abdomen, in the arm as far as the elbow, and under the knee. It is only after passing through these glands that the lymph is ready to enter the blood. The

lymphatics of the left side of the body empty their contents through the thoracic duct into the left subclavian vein; those on the right side into the right subclavian vein. See **LACTEALS**; **LYMPH**.

Lynch'burg, VA., a city in Campbell co., 124 mi. w. of Richmond, on the James River and on the Chesapeake & Ohio, the Norfolk & Western and the Southern railroads. It has a picturesque location on the hills along the river, where the Blue Ridge and the peaks of Otter Mountains make a beautiful background. The surrounding region is agricultural and contains deposits of coal, iron and granite. The main industries include large tobacco factories, iron and brass foundries, flour and cotton mills, shoe factories and tile works. Randolph Macon Women's College and the Miller Female Orphan Asylum are located here. The place was settled in 1786 and was incorporated in 1823. It was an important base of supplies for the Confederate army during the Civil War. Population in 1910, 29,494.

Lynch Law, the practice of punishing men for offenses, through private, unauthorized means, without legal trial. The origin of the phrase was in the name of one Charles Lynch of Virginia, who adopted this mode of punishing offenders. Lynchings are most frequent in the South and West, and negroes are more often the victims than whites. There is a growing sentiment in opposition to lynch law, and the number of cases in 1904, eighty-six, is the lowest recorded in fifteen years.

Lynn, MASS., a city of Essex co., 10 mi. n. e. of Boston, on Massachusetts Bay and on the Boston & Maine and the Boston, Revere Beach & Lynn railroads. High Rock, with its well-equipped observatory, Lynn Woods Reservation and Lynn Beach are features of interest. The two leading industries are the manufacture of women's shoes, for which there are about 300 factories employing 12,000 people, and the manufacture of electric motors and other electrical appliances by the General Electric Company, which employs 11,000 people. Other industries include the manufacture of machinery, leather, patent medicines and other goods. The place was settled in 1629 and was known as Saugus until 1637. Population in 1910, 89,336.

Lynx, the name given to different wild cats found in North America, Europe, and Asia, north of the Himalaya Mountains. The common lynx of North America is from 30 to 40 inches in length and has stout limbs and a short, thick tail. The species found in the north is

Lyon

known as the *Canada*, or *red lynx*, and that in the south as the *southern lynx*, or *bob cat*. The Canada lynx is of a grizzled, brownish-gray color and has tufts of black hair on the tips of its ears and at the end of its tail. The lower part of the animal is white. The bob cat is nearer a reddish brown, especially in the summer, and its fur is marked with spots and lines, which are most distinct about the head. The lynx feeds upon small animals, rats, mice and sometimes upon sheep and goats. It is especially fond of poultry, and in some localities it is a pest to the farmer. The animals seek their prey by night, and during the day they sleep in small caves or hollow trees. The fur is of good quality and finds a ready sale. For this reason and because of their depredations, these animals have been exterminated in most of the older states.

Ly' on, MARY (1797-1849), an American educator, born at Butler, Mass., and educated at Sanderson Academy and Byfield Academy. On completing her education, she became a teacher in Sanderson Academy, and from the outset she was interested in the education of women. She was one of the founders of a seminary for girls, and had charge of the institution for a number of years; but she is best known as the founder and first principal of the Mount Holyoke Female Seminary at South Hadley, Mass. Under her management the school attained a high degree of excellence and a wide reputation. It was owing largely to her influence and her ideals concerning higher education for women that this school attained the reputation which it now holds.

Lyon, NATHANIEL (1818-1861), an American soldier, born in Ashford, Conn., and educated

Lyons

at West Point. He became lieutenant of infantry and served in the Seminole War, and for his gallant part in the chief battles of the Mexican War he was made captain. At the beginning of the Civil War he was stationed at Saint Louis, and by his prompt action he did much toward keeping Missouri on the Union side. He was killed at the Battle of Wilson's Creek and left his entire fortune, \$30,000, to the government, to aid in carrying on the war.



LYNX

Ly' ons, a city of France, the third in population, and the second in industrial importance, in the country. It is the capital of the Department of the Rhône, is 250 miles south-southeast of Paris and 160 miles north of the Mediterranean. Among its chief buildings are the Cathedral of Saint Jean, which dates from the fifteenth century; the Church of Ainay, which has a cupola supported by ancient Roman columns and a crypt believed to be of the ninth century; the Church of Saint Nizier, and the modern Church of Notre Dame de Fourvière.

Lyons carries on various industries, among them the manufacture of hats, books, perfume, soap and laces, but it is noted chiefly for its silk manufactures, which are the greatest in the world. The silk industry in the town and surrounding neighborhood gives employment to almost 250,000 people. There is a large trade by railway, river and canal. Lyons was a place

Lyons

of some importance when Gaul was invaded by Julius Caesar, and it remained the chief city of Gaul throughout the greater part of the life of the Empire. During the Middle Ages it did not lose at any time all of its importance, and Louis XIV greatly improved the city. While the French Revolution was in progress, the city suffered severely; thousands of its citizens were put to death by the emissaries of the Paris Convention, and its chief buildings were destroyed. Population in 1911, 523,796.

Lyons, GULF OF, a bay of the Mediterranean, on the southeastern coast of France. The principal ports on this gulf are Toulon, Marseilles and Cette.

Lyre, one of the most ancient stringed instruments of music, consisting of a frame, with two horn-like pieces rising from it, and a crosspiece between the horns, from which strings were stretched to the lower part of the frame. It is said to have had originally only three strings, but the number was afterward increased to seven, then to eleven and finally to sixteen. The lyre was common among the Egyptians, Assyrians and Greeks, and it was considered to be the favorite instrument of Apollo, the god of music and poetry.

Lyre Bird, a very peculiar bird, living only in Australasia, where there are but three species. These birds take their name from the remarkable tails of the males, which in shape and arrangement resemble somewhat an ancient lyre. The birds are brownish, about the size of small hens, and live principally upon the ground, whence they can leap to branches many feet above ground. When running, they spread their tails out horizontally. During the breeding season the male bird is very vain, and scraping out little hollows in the ground, it struts about or dances, with erect tail and drooping wings, and sings a loud, rather pleasing song.

Lyric Poetry, originally, poetry sung to, or suited for, the lyre; in modern usage, that class of poetry in which are expressed the poet's own thoughts and feelings, or the emotions attributed to another, as opposed to epic or dramatic poetry, to which a story of action is essential. There may be a lyrical element in other kinds of poetry, in epics or dramas, for example, but narrative and action have little to do with truly lyric poetry.

Among the most beautiful of English lyrics are the songs in Tennyson's *Princess*, "The Splendor falls on castle walls," "Sweet and Low," "Tears, idle tears," "As through the land at eve we went" and "Home they brought her

Lyric Poetry

warrior dead"; Wordsworth's *My Heart Leaps Up*, *The Daffodils* and *The Solitary Reaper*; Tennyson's *Break, Break, Break*, and *Crossing the Bar*; Holmes's *Chambered Nautilus*; Long-



LYRE BIRD

fellow's *Hymn to the Night*; Shelley's *Cloud*; Milton's *L'Allegro* and *Il Penseroso* and Burns's *Highland Mary* and *To Mary in Heaven*. Tennyson's "Tears, idle tears" is here given entire:

Tears, idle tears, I know not what they mean,
Tears from the depth of some divine despair
Rise in the heart, and gather to the eyes,
In looking on the happy autumn fields,
And thinking of the days that are no more.
Fresh as the first beam glittering on a sail,
That brings our friends up from the underworld,
Sad as the last which reddens over one
That sinks with all we love below the verge;
So sad, so fresh, the days that are no more.
Ah, sad and strange as in dark summer dawns
The earliest pipe of half-awaken'd birds
To dying ears, when unto dying eyes
The casement slowly grows a glimmering square
So sad, so strange, the days that are no more.
Dear as remember'd kisses after death,
And sweet as those by hopeless fancy feign'd
On lips that are for others; deep as love,
Deep as first love, and wild with all regret
O Death in Life, the days that are no more

Lyander

Lysan'der (?-395 B. C.), a Spartan general who was appointed to the command of the Spartan fleet off the coast of Asia Minor in 407 B. C., during the Peloponnesian War. In 405 he defeated and captured the Athenian fleet off Aegospotamos, and thus put an end to the war. He was killed in a battle with the Thebans.

Lysimachia, *li se mak'e ah*, a genus of herbs, belonging to the primrose family. Four species occur in the United States, and many others in various parts of the world. They are usually leafy-stemmed and bear yellow flowers, which in some species are large and handsome. *Moneywort* is the common name of a pretty little trailing vine that forms dense mats and has been introduced into the United States from Europe. Its roundish, light-green leaves, bright yellow flowers and graceful trailing stems make it a favorite for growing in hanging baskets.

Lysip'pus, a Greek sculptor who flourished in Sicyon about 330 B. C., in the time of Alexander the Great. He worked only in bronze, in which he fashioned about fifteen hundred

Lytton

statues, none of which have been preserved except the *Apoxyomenos* in the Vatican. Lysippus claimed to represent the human figure as it seems to be to the eye, and not as it actually is. His statues were characterized by a small head, long legs and slender figure. He became famous by his statues of Zeus, Heracles, Helios and of Alexander the Great, whom he represented many times. Celebrated colossal statues of Lysippus were those of Helios in Rhodes, Zeus in Tarentum and Poseidon in Corinth.

Lyt'ton, EDWARD GEORGE EARLE LYTTON-BULWER. See BULWER-LYTTON, EDWARD GEORGE EARLE.

Lytton, EDWARD ROBERT BULWER (1831-1891), an English poet and statesman, son of the novelist Bulwer-Lytton. He early attained a reputation as a poet, under the name of Owen Meredith; and he published *Clytemnestra and Other Poems*, *Tannhauser*, *The Wanderer*, *Fables in Song*, *Glenaveril*, and the highly popular *Lucile*, besides prose works, including the life and letters of his father.



M is the thirteenth letter of the English alphabet. The character has come, with but little change, through the Greek and Latin from the Phoenician. *M* has in English but one sound, and it is silent only in a few foreign words, as *mnemonic*. As a symbol, *M* means 1000.

Ma'bie, HAMILTON WRIGHT (1846-1916), an American critic, editor and essayist, born at Coldspring, N. Y., educated at Williams College and at the law school of Columbia University. He was associated with the *Christian Union*, later called *The Outlook*, and he became associate editor of this periodical. Among his works, most of which are essays on nature and literature, are *My Study Fire*; *In the Forest of Arden*; *William Shakespeare: Poet, Dramatist and Man*, and *A Child of Nature*. Mr. Mabie has also gained great popularity as a lecturer.

McAlester, OKLA., the county-seat of Pittsburg co., located 120 mi. e. of Oklahoma City, on the Chicago, Rock Island & Pacific and the Missouri, Kansas & Texas railroads. It is surrounded by rich lumber and farm lands, and lies in the midst of the most extensive coal fields of the state. Many private and public modern buildings have been constructed recently, and on account of cheap fuel, manufacturing industries are springing up rapidly. A large plant for the manufacture of hydraulic cement has just been constructed in one of the outlying districts. The city has all modern conveniences, including water works and electric lights. An excellent public school system has been developed. The state penitentiary is located here. Population in 1910, 12,954.

Macao, mah'kow, a seaport town and Portuguese settlement in China, on a peninsula at the mouth of the Canton River, about 40 mi. from Hong Kong. It is considered the most healthful residence place in southeast Asia. The settlement has an area of about four square miles. Its principal export is tea, but its commerce, formerly extensive, has greatly declined since the rise of Hong Kong and the opening of

the Chinese treaty ports. It was in 1575 that the Portuguese first obtained permission to form a settlement and to trade at Macao, but not until 1887 was it recognized by the Chinese as Portuguese territory, over which China had no rights. Population, about 60,000.

Macaque, ma kak', a genus of monkeys, found in Asia. They are all of medium size and have short tails. Their food consists of fruits, leaves, insects, frogs and lizards, and one species feeds almost entirely upon crabs. The *bonnet monkey* takes its name from a crest of hair on the crown of the head. In India the monkeys of this genus often become pests, because they rob fruit and provision stores. Some species are easily tamed and are frequently trained as pets. See BARBARY APE.

Mac'aro'ni, a preparation of wheat flour, used as food. In the manufacture of macaroni, only the hardest wheat of the best quality is used. The wheat is ground into a coarse flour and then sifted, and the flour is mixed into a dough with warm water. This is placed in a cylinder with a perforated base. A plunger is then placed in the cylinder and forces the dough out through the holes at the opposite end, forming the sticks of macaroni. These are cut into lengths of about ten feet and are then hung over frames to dry. The largest sticks form macaroni, while the smaller ones are known as *vermicelli* or *spaghetti*. Macaroni is manufactured in large quantities in Italy, where it is a national dish. It is also exported to Great Britain and the United States. It is manufactured to a considerable extent in France and in the United States. In the modern method, machinery is used and takes the place of much of the hand labor formerly necessary.

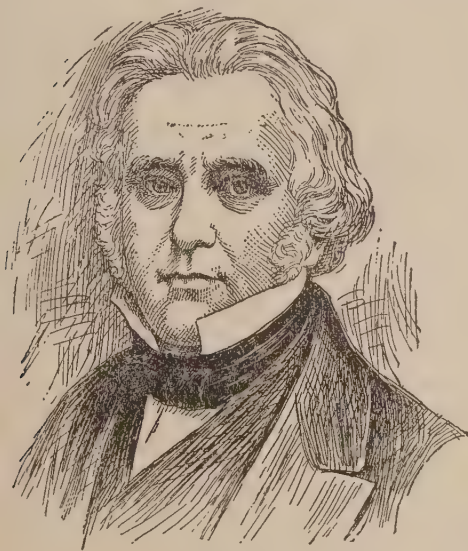
MacArthur, ARTHUR (1845-1912), an American soldier. He entered military service in 1862, with the twenty-fourth Wisconsin Infantry, took part in some important campaigns and in 1866 was commissioned first lieutenant in the regular army. At the beginning

Macassar

of the Spanish War he was made brigadier general of volunteers and was sent to Havana. The following year he was sent to the Philippines, and on the retirement of General Otis he became commander of the forces in the Philippines and military governor of the islands. He was made major general in 1901, assistant chief of staff in 1906, and later in the same year, lieutenant general.

Macas'sar, STRAIT OF, a body of water separating the islands of Borneo and Celebes and varying in width from 80 to 140 miles. It is about 400 miles long and contains a number of small islands.

Macaulay, *ma kaw'ly*, THOMAS BABINGTON, Lord Macaulay (1800-1859), an English historian, essayist and statesman, born at Rothley Temple, Leicestershire. In 1818 he entered Trinity College, Cambridge, where he obtained the Chancellor's medal for a poem on *Pompeii*, and a second time for a poem on *Evening*. He received a fellowship and took his M. A. degree in 1825. Before this he began to contribute to *Knight's Quarterly Magazine*, in which appeared his poems *The Spanish Armada*, *The Battle of Ivry* and *Moncontour*, and in



LORD MACAULAY

1825 he inaugurated his brilliant career in the *Edinburgh Review*, by his article on *Milton*. He was elected to Parliament in 1830 and was a most vigorous and effective partisan of the reform movement. During the years from 1834 to 1838 he was in India as a member of the

Maccabees

Supreme Council there, and on his return he was again made a member of Parliament. In 1842 he published his *Lays of Ancient Rome*, and in 1848 appeared the first two of the five volumes of his *History of England from the Accession of James II*. This brilliant rhetorical exposition, although touched with partisanship and with a tendency to paradox, has attained the position of an English classic. Its popularity when it first appeared was phenomenal, and it is said that in America its sales exceeded those of any book except the Bible. Macaulay was created a peer in 1857, and at his death he was buried in Westminster Abbey. His *History* was unfinished at his death, having been brought down only to the time of William III. Fascinating in style, this great work suffers from the partiality of its author. *The Life and Letters of Macaulay* has been published by his nephew, Sir George Otto Trevelyan.

Macaw', a genus of large parrots, found in South America. They are characterized by their strong powers of flight and their brilliant plumage. The tail is long and wedge-shaped, and the wings are long and pointed. The feet are strong, the cheeks naked and the bill short, strong and highly arched. The largest species, the *great scarlet*, or *red and blue macaw*, is more than three feet long. Its body is bright red, its tail is blue and crimson and its wings are greenish-blue and yellow. Its cheeks are bare, white and wrinkled, and the upper mandible of the beak is white. The *green macaw* is easily tamed, but none of the macaws can be taught to speak readily. Their notes are hoarse, and their screams are piercing; consequently, while prized for their brilliant coloring, they are somewhat annoying as pets. They feed upon fruits and seeds and are very destructive to corn and some other crops.

Macbeth' (?-1057), king of Scotland. In 1040, in a revolt against Duncan, king of Scotland, he killed the king and seized the throne. At the death of their father the sons of Duncan had taken refuge with their uncle Siward, earl of Northumberland, and with his aid they invaded Scotland in 1054; a battle was fought at Dunsinane, but it was not until 1057 that Macbeth was finally defeated and slain at Lumphanan, in Aberdeen. The legends which gradually gathered round the name of Macbeth were reproduced by Holinshed in his *Chronicle*, which is the source of Shakespeare's tragedy.

Mac'cabees, a dynasty of ruling Jewish priests, of whom the first to come into promi-

Maccabees

nence was Mattathias, who opposed the persecutions of Antiochus Epiphanes. With his sons and a few followers he destroyed heathen worship. When Mattathias died, 166 B. C., his sons Judas and Jonathan became successively leaders of the national movement. The last remaining member of the family was Simon, under whose rule trade and agriculture flourished. He was treacherously murdered by Ptolemy, his own son-in-law, 135 B. C.

Maccabees, KNIGHTS OF THE, a secret beneficiary and social order, founded Sept. 1, 1883. The so-called supreme tent, or headquarters of the order, is at Port Huron, Mich. Below this governing body are 8 grand tents and more than 5000 subordinate tents and hives, including, all told, 325,000 members. The order pays death, accident, sickness and disability benefits, and since its organization it has dispersed more than \$25,000,000 in this way. The order known as the Ladies of the Maccabees is affiliated with this organization.

McCarthy, JUSTIN (1830-1912), a British novelist, historian and politician, born at Cork, Ireland. He traveled for three years in the United States, contributed to various English and American magazines and was connected with the New York *Independent*. After his return to England he held for years an editorial position on the staff of the *Daily News*. He was prominent in Parliament and was the leader of the Home Rule party after Parnell's overthrow. His writings include *History of Our Times*, *History of the Four Georges*, *The French Revolution* and *The Story of Gladstone's Life*.

McClellan, GEORGE BRINTON (1826-1885), an American general, born at Philadelphia. He was trained at West Point, served in the Mexican War and for gallant service at the battles of Contreras, Churubusco and Chapultepec was brevetted lieutenant and captain. In 1855 he was appointed to the commission which reported on the condition of European armies, and he watched the military operations during the Crimean War. At the outbreak of the Civil War he was appointed major general in the army, superseded McDowell in command of the Army of the Potomac after the first Battle of Bull Run and became commander in chief of the armies of the United States in November, 1861. In this capacity he organized the raw levies of the north and advanced toward Richmond the following spring. After the evacuation of Yorktown by the Confederates he led the Army of the Potomac in a series of engage-

McClelland

ments which terminated in the Seven Days' Battles, when he had to retire from his lines in front of Richmond. The result of this was his removal from the position of commander in chief.



GEORGE B. MCCLELLAN

Afterward, when Lee advanced into Maryland, McClellan fought the battles of South Mountain and Antietam and compelled the Confederate forces to retire. The authorities at Washington were dissatisfied with his apparent slackness in following up this victory, and McClellan was relieved of his command and retired from the army. In 1864 he was nominated for the presidency, but was defeated by Lincoln. In 1877 he was elected governor of New Jersey.

McClelland, JOHN ALEXANDER (1812-1900), an American soldier, born in Breckenridge County, Ky. He was taken in infancy to southern Illinois, where he received an elementary education, and in 1832 he was admitted to the bar. He served for a time in the Black Hawk War, entered journalism as editor of the Shawneetown (Ill.) *Democrat*, was elected to the state legislature and from 1843 to 1851 was a Democratic member of Congress. Again in 1859 he was elected to Congress from the Jacksonville district. At the outbreak of the Civil War he was appointed brigadier general and raised a force, which he commanded during the early months of the struggle at Belmont and Fort Donelson. He was appointed major general of volunteers in March, 1862, fought with distinction at the Battle of Shiloh and in January, 1863, superseded General Sherman in command of the Vicksburg expedition, but was soon afterward superseded by General Grant. In No-

McCook

vember, 1864, he resigned from the army and retired to the practice of his profession at Springfield, Ill.

McCook', ALEXANDER McDOWELL (1831-1903), an American soldier, born in Columbiana County, Ohio. He was educated at West Point, graduating in 1852, served in indian campaigns and as instructor at the military academy. At the opening of the Civil War he was made colonel of a volunteer regiment and at the Battle of Bull Run earned the brevet of major; later, for gallant service in Kentucky and Tennessee, he became a major general of volunteers. He also fought with Buell in Kentucky, at Murfreesboro and Chickamauga, and at the close of the war he was brevetted brigadier general and later major general in the regular army. He retired from active service in 1895, with the full rank of major general, and served in various special commissions until his death.

McCormick, CYRUS HALL (1809-1884), an American inventor, born in Virginia. In 1831 he built the reaping machine, which, with his improvements, has done so much for the cause of agriculture. In 1847 McCormick removed to Chicago, where the extensive works of the company were established. McCormick founded in Chicago the McCormick Theological Seminary for the Presbyterian Church and endowed a professorship in Washington and Lee University in Virginia. See REAPING MACHINE.

McCosh', JAMES (1811-1894), a Scotch theologian, author and educator, born in Ayrshire and educated at the universities of Glasgow and Edinburgh. In 1868 he was elected president of the College of New Jersey (now Princeton University), which position he held for twenty years. During his administration the work of the college was greatly broadened and organized on a university basis, and the endowment was largely increased. Dr. McCosh was widely known through his lectures and writings on philosophical subjects and on education and psychology. Among his works best known in this country are *The Emotions*, *Psychology of the Cognitive Powers* and *Our Moral Nature*.

McCulloch, ma kul'lo, HUGH (1808-1895), an American financier, born at Kennebunkport, Maine, and educated at Bowdoin College. He began the practice of law at Fort Wayne, Ind., in 1833, but in 1845 he entered the banking business. In March, 1865, McCulloch was appointed secretary of the treasury by President Lincoln and retained the position through

Macdonald

Johnson's term. Upon retiring from office, he entered the firm of Jay Cooke & Co., which thereafter was known as Jay Cooke, McCulloch & Co., and engaged in banking in London. He again became secretary of the treasury in 1884, but retired the following year. He was the author of a valuable book entitled *Men and Measures of Half a Century*.

McCutcheon, JOHN TINNEY (1870-), an American cartoonist and special newspaper correspondent, born in Tippecanoe County, Indiana. He was educated at Purdue University, where he studied art under Prof. Ernest Kanufft. He was first brought to public notice by his cartoons while correspondent for the *Chicago Record* in 1896. He made tours of special service in India, Burmah, Siam, China, Korea and Japan. During the Spanish-American War he attended the military expeditions in the occupation of the Philippines. After this he went to South Africa and joined the Boers in the interest of his paper. In 1900 he furnished political cartoons for the *Record-Herald*, and in 1903 he became the cartoonist for the *Chicago Tribune*. He is the author of *Stories of Filipino Warfare* and *Cartoons by McCutcheon*. Among his famous cartoons is the series called *The Cartoons that Made Prince Henry Famous*.

Macdonald, FLORA (1722-1790), a Scottish woman, famous for the part which she took in the escape of Charles Edward Stuart after the Battle of Culloden (See STUART, CHARLES EDWARD). When, after this battle, he was in danger of capture by the troops of the English king, Flora rescued him, disguised him as her servant and helped him to escape to the Isle of Skye. In 1774, with her husband, Allan Macdonald, she came to America and settled in Fayetteville, N. C. Macdonald served during the Revolutionary War in the British army.

Macdonald, GEORGE (1824-1905), a Scottish novelist and poet, born at Huntley, Aberdeenshire, and educated at Aberdeen University. He was for several years a preacher, before he turned his attention to literature. Among his numerous novels are *David Elginbrod*, *Alec Forbes*, *Robert Falconer*, *Malcolm*, *The Marquis of Lossie* and *Salted with Fire*. He also published several volumes of verse and some stories for children, as *At the Back of the North Wind* and *The Princess and the Goblin*. In 1872-1873 he made a lecturing tour in the United States.

Macdonald, JOHN ALEXANDER, Sir (1815-1891), a Canadian statesman, born in Glasgow, Scotland. He went with his parents to Canada,

there studied law and was admitted to the bar. He was elected to the Dominion Parliament, became conspicuous as a Conservative leader and was chosen to a cabinet position in 1854. He became first premier of federated Canada in 1867, a position which he held until 1873, when he resigned. He resumed the office again in 1878 and retained it until his death. Macdonald was one of the British commissioners to settle the Alabama Claims (See ALABAMA, THE) and was one of the signers of the Treaty of Washington in 1871. He was an active promoter of the Canadian Pacific Railway and one of the prime movers in securing the confederation of the Canadian provinces. Consult Macpherson's *Life of Sir John Macdonald*.

McDonough, *mak don'ô*, THOMAS (1783-1825), an American naval officer, born in Delaware. He entered the navy as midshipman in 1800, served in the Barbary War of 1801-1803 and in various minor commissions until the outbreak of the War of 1812. In that war he served first as lieutenant on the *Constitution*, but in September of 1812 he was commissioned to build a fleet on Lake Champlain. September 11, 1814, he successfully met a British fleet, superior to his own, under Captain George Downey. For this service he was made captain and was granted a gold medal by Congress. Later he commanded other vessels in the navy and died at sea.

MacDowell, EDWARD ALEXANDER (1861-1908), an American musician, born in New York. He studied music in Paris, Wiesbaden and Frankfurt, and became well known as a teacher, pianist and composer before his return to the United States in 1888. His works and his playing became very popular in his own country, and before his death he was generally recognized as probably the foremost American composer. From 1896 to 1904 he was head of the department of music at Columbia University, but overwork told on him, and in the year following his resignation his mind failed. A characteristic of MacDowell's work is his introduction of touches of American folk-music, notably indian. He composed an *Indian Suite* for the orchestra, and his very popular *Woodland Sketches* for the piano make use of indian themes. In all, he published about sixty works, which include almost three hundred separate pieces.

McDow'ell, IRVIN (1818-1885), an American soldier, born at Columbus, Ohio, educated in France and at West Point. He served in the Mexican War and was brevetted captain for

gallant service at Buena Vista. Soon after the opening of the Civil War, he was appointed brigadier general of volunteers and was placed in command of the Army of the Potomac, but suffered a defeat at the first Battle of Bull Run, which caused his removal. Later he commanded a corps under McClellan and was assigned to the defense of Washington, being made major general of volunteers. He was conspicuous at the battles of Cedar Mountain and Bull Run, but was later relieved from field duty. He asked for a court of inquiry, which acquitted him of all charges. In March, 1865, he was brevetted major general for his gallantry at Cedar Mountain and seven years later was given the full rank of major general. He retired from active service in 1882.

Mace, *mase*, an East Indian spice, the dried covering of the seed of the nutmeg, this covering being a fleshy, net-like envelope, somewhat resembling the husk of a filbert. When fresh it is of a beautiful crimson hue. It is extremely fragrant and aromatic and is chiefly used in cooking or in pickles. See NUTMEG.

Mace, originally, a weapon of offense, consisting of a club or staff with a heavy metal head. Later the mace came to be a symbol of office, and was borne before officials; and today it is in use chiefly as an emblem of authority in legislative bodies. The maces used in the House of Representatives in the United States and in the houses of the Parliament of Great Britain are very elaborately wrought and richly ornamented.

Macedonia, *mas e do'ny ah*, in ancient geography, a territory lying n. of the Aegean Sea and Thessaly, e. of Illyria and w. of Thrace. The name is now applied to no political division, but is often used in connection with the territory so called in ancient times. The country is mountainous, and was famous in ancient times for its gold and silver mines. The capital and chief city was Pella.

It is thought probable by most historians that the Macedonians were a Greek tribe which remained behind when other tribes migrated into Greece, but the customs and language became modified so that the Macedonians were a distinct people. The country did not become powerful until the accession of Philip II to the throne in 359 B. C. Under him Macedonia became leader of the Greek states (See GREECE, subhead *History*; PHILIP II of Macedon), and under Alexander the kingdom was immensely extended (See ALEXANDER THE GREAT). After the death of Alexander the Macedonian Empire

was divided among his generals, the chief divisions being Macedonia, Egypt, Syria, Pergamos, Bithynia, Rhodes and the Greek states. In 146 B. C. Macedonia was made a Roman province, and in 395 A. D., when the Roman Empire was divided, it became a part of the Byzantine Empire, at the fall of which it came into the power of the Turks, part of whose territory it now forms. It is inhabited chiefly by Bulgarians, Turks, Greeks and Albanians. During the latter half of the eighteenth and the nineteenth century the Christian inhabitants of Macedonia frequently rose against the Turkish rule, but such revolts have always been put down with wholesale massacre. In 1903 both Russia and Austria demanded of Turkey certain reforms in the administration of Macedonia, but although the sultan promised to grant these, no steps were taken toward that end. The people rose in arms, and a desultory warfare was carried on throughout the entire summer. Late in the year the Macedonians were induced to lay down their arms and return to their homes.

In 1912 the allied Balkan states declared war on Turkey, their object being to secure reforms for the related peoples of Albania and Macedonia. As a result of the struggle Macedonia ceased to have a separate existence, the territory formerly called by that name being divided among Greece, Bulgaria and Servia. See BALKAN WAR.

McGill College and University, a co-educational institution, established at Montreal, Canada, in 1821, by the bequest of Hon. James McGill. The present organization includes the department of arts, to which women are admitted, the department of applied science, and departments of law and of medicine. There are also several divinity schools affiliated with the university. McGill is affiliated with the Universities of Oxford, Cambridge and Dublin, and it has a number of affiliated schools and colleges in the Dominion. Its government is similar to that of English universities. The supreme authority rests in the governor-general of the Dominion. The executive officer is styled principal and is *ex officio* vice-chancellor. The chancellor is the president of the board of governors and is usually a non-resident officer. The faculty numbers over 75, and there are over 1000 students. The library contains 92,000 volumes, the endowment exceeds \$3,000,000, and the annual income is over \$410,000.

McGillivray, ALEXANDER (about 1740-1793), chief of the Creek indians, son of a Scotch

trader and a half-breed indian woman. He was educated at Charleston and for a time was engaged in business in Savannah, but later he became interested in the indian trade and was chosen "Emperor of the Creek Nation." In the Revolutionary War he took active part against the patriots, and he continued border hostilities until 1790, when he signed a treaty of peace for his tribe.

Machiavelli, *mah'kya vel'le*, NICCOLO (1469-1527), a distinguished Italian statesman and historian, born at Florence. For more than fourteen years he guided the destinies of the Florentine Republic, undertook embassies, concluded treaties and jealously guarded the rights and liberties of his native city. When the Medici returned to power in 1512, by the aid of the pope, Machiavelli was deprived of his office and retired to his country house. Here he devoted himself to literary labor, the chief results of which are found in his *History of Florence*, *Discourses upon the Ten First Books of Livy*, *The Prince*, by which he is best known, and the comedies of *La Mandragola* and *La Clizia*. The name of Machiavelli was long synonymous with all that is tortuous and treacherous in state affairs.

Machine Gun, a name given to any of those pieces of ordnance that are loaded and fired mechanically. They have usually a number of separate barrels. Such guns, while having their own use in warfare by land, are regarded as being of special value in marine warfare and are intended mainly for use against torpedo boats. As the range is limited, machine guns can never take the place of cannon and rifle, however deadly the guns may be at short range. The first machine gun to come into prominence was the French *mitrailleuse*, which was employed in the Franco-German War. The Gatling gun first appeared in the United States and was speedily adopted with modifications by Great Britain and other powers. Other guns of this kind are the Hotchkiss, the Nordenfeldt and the Gardner. As to rapidity of fire the Nordenfeldt has slightly the superiority; yet the two-barreled Gardner can fire 236 rounds, and the five-barrel Gardner, 330 rounds, in half a minute. In continuous work and ease and rapidity of fire, the Gardner gun has a marked superiority over the Nordenfeldt. The Hotchkiss gun fires heavier projectiles than the other machine guns. A more recent invention is the Maxim, which, after the first shot, continues to fire time after time by means of the power

derived from the explosion of each successive cartridge.

Mackay, m'kay', JOHN WILLIAM (1831-1902), an American capitalist, born in Dublin, Ireland. He moved to New York in childhood, in 1851 went to California and in the following year to Nevada, where, in 1872, he was one of the discoverers of the Bonanza mines, of which he owned two-fifths. Their production has been enormous. In 1884, with James Gordon Bennett, he founded the Commercial Cable Company and Postal Telegraph Company and precipitated a long fight with the Western Union. Later he headed the company which constructed and laid the American Pacific Cable (See CABLE, SUBMARINE). He died in London.

McKees'port, PA., a city in Allegheny co., 15 mi. s. e. of Pittsburg, at the confluence of the Monongahela and the Youghiogheny rivers, and on the Pittsburg & Lake Erie, the Baltimore & Ohio and the Pennsylvania railroads. It is in a region having deposits of bituminous coal and natural gas, and it has a vast iron and steel industry. The National Tube Works has a very large plant here, employing between 8000 and 10,000 men. There are also manufactures of railroad cars, locomotives, glass and lumber products. The Douglass Industrial College is located here, and the city contains a hospital, a Carnegie library, a business college, a fine high school building, a Y. M. C. A. building, and about thirty churches. The place was settled in 1795 and was incorporated as a borough in 1842 and as a city in 1890. Population in 1910, 42,694.

McKees Rocks, PA., a borough in Allegheny co., on the Ohio River, opposite Allegheny, and on the Pittsburg & Lake Erie and the Pittsburg, Chartiers & Youghiogheny railroads. It has extensive railroad shops, iron and steel works, lumber and flour mills, glass works and other factories. The place was settled by John McKee in 1830 and was incorporated as a borough in 1892. The population has increased very rapidly during the last decade. Population in 1910, 14,702.

McKen'na, JOSEPH (1843-), an American jurist and statesman, born in Philadelphia. His family removed to California in 1855, where he attended public schools, studied law and was admitted to the bar when twenty-two years old. He served several terms as prosecuting attorney and was a member of the state legislature. He was elected to Congress in 1884 and held his seat until 1892, when he was appointed United

States circuit judge by President Harrison. In 1897 he was appointed attorney-general, and in 1898 he became a justice of the United States Supreme Court.

Macken'zie, formerly a separate district and territory of Canada, bounded on the n. by the Arctic Ocean; on the e. by Keewatin; on the s. by Manitoba, Saskatchewan, Alberta and British Columbia, and on the w. by Yukon. Its area was over 500,000 square miles, and the population in 1901 was 5216. The country is generally low, sloping gradually toward the north. It contains a large number of lakes, chief among which are Great Bear Lake, Great Slave Lake and Aylmer Lake. The Mackenzie is the chief river; it flows across the western part of the territory and empties into the Arctic Ocean. In the north central part is the Coppermine River, flowing into Coronation Gulf. The district of Mackenzie, for governmental purposes, is part of the Northwest Territories.

Mackenzie, ALEXANDER (1822-1892), a Canadian statesman, born in Perthshire, Scotland. Originally a stone mason, he emigrated to Kingston, Canada, in 1842 and began business as a builder and contractor. In 1852 he was made editor of a Liberal newspaper, and he entered the Ontario parliament in 1861 and the Dominion parliament in 1867. He soon became leader of the Liberal party, and on the resignation of Sir John Macdonald in 1873, he became premier and retained office with great success till 1878. He remained in parliament until his death, heading the opposition for a time, and he many times refused the honor of knighthood.

Mackenzie, ALEXANDER, Sir (1755-1820), a Canadian explorer, born at Inverness, Scotland. He emigrated to Canada in 1775 and in the employ of the Northwest Fur Company he explored the great river named after him, from the western end of Great Slave Lake to the Arctic Ocean (1789). He made another expedition to the western coast (1792) and was the first white man to cross the Rocky Mountains.

Mackenzie, MORELL, Sir (1837-1892), an English physician and surgeon, famous for his successful operations on the larynx. When the German emperor Frederick III was attacked with cancer of the throat, Mackenzie became his physician and stayed with him to the end, notwithstanding the bitter opposition of German physicians. Among Mackenzie's published works are *A Manual of Diseases of the Throat and Nose*, *The Hygiene of the Vocal Organs*

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and an account of the fatal illness of the German emperor.

Mackenzie, WILLIAM LYON (1795–1861), a Canadian politician and statesman, specially noted as leader of the rebellion of 1837–1838. He was born in Scotland, but at the age of twenty-five he came to Upper Canada and settled at York, now Toronto. Four years later he established the *Colonial Advocate*, a paper in which he attacked the government and severely criticised many of its measures. He was elected to the legislature of Upper Canada in 1828 and was reelected three successive times, but was refused a seat because of an alleged libel on the ministry. In 1832 he visited England as a delegate to secure reforms in government and the redress of certain grievances. He was successful in his mission, and on his return he was chosen the first mayor of Toronto and was again elected to the legislature. During these years Mackenzie used his position and opportunity to create a strong sentiment against the existing government, and he publicly declared his sympathy with the inhabitants of Lower Canada (Province of Quebec), who were even more open in their opposition to the existing conditions than were the inhabitants of Upper Canada. In 1837 he led a movement to establish a new government and overthrow the existing order. He and his followers were defeated by a detachment of Canadian troops, and Mackenzie fled to the United States, where he established headquarters on Navy Island in the Niagara River and attempted to gather about him a following to invade Canada. Prompt action on the part of the United States authorities, however, prevented the success of his project, and he went to New York, where he remained several years, engaged in newspaper work. He returned to Canada after the proclamation of amnesty in 1849 and from 1851 to 1858 he served in Parliament. See CANADA, subhead *History*.

Mackenzie River, a large river in the Northwest Territories of Canada. It flows out of Great Slave Lake, first west, then north, finally northwest, and after a course of about 900 miles it falls into the Arctic Ocean by numerous mouths. Its principal affluents, including the feeders of Great Slave Lake, are the Athabasca, the Great Slave River, the Liard and the Peel, and it is navigable throughout its course. It was discovered by Alexander Mackenzie in 1789.

Mack'erel, one of the important food fishes, which inhabits almost the whole of the European

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seas and is found in tropical and temperate zones in other parts of the world. There are several species, but the common mackerel is the most important as a food fish. When full-grown it is from seventeen to eighteen inches long and weighs about three pounds. It is of a dark green color above, shading to a darker



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color below the water line. In the United States the center of the mackerel industry is at Gloucester and Yarmouth, Mass., whence mackerel fleets fish all along the coast. The greater part of the product is salted.

Mackinac, mak'in ack, Island, an island and city in Mackinac co., Mich., 260 mi. n. by w. of Detroit and 320 mi. n. by e. from Chicago, in the Straits of Mackinac, at the northwest extremity of Lake Huron. The island is about 2 miles wide and 3 miles long and is a state park. Its southern end rises abruptly from the lake, and the bluff is the site of the old Fort Mackinac, which was an important military post previous to and during the War of 1812, but has long since been vacant. The city of Mackinac is at the foot of the bluff along the south shore of the island and is a noted summer resort, during the height of the season having from 8000 to 10,000 visitors. The city contains a number of large hotels and other structures erected for the pleasure and convenience of summer visitors. The regular inhabitants number about 675.

McKin'ley, MOUNT, the highest peak of North America, situated in the south central part of Alaska. Its height is 20,464 feet, and it is covered with snow and has extensive glaciers. It was ascended on June 7, 1913, by Archdeacon Hudson Stuck and three companions.

McKinley, WILLIAM (1843–1901), an American statesman, the twenty-fifth president of the United States. He was born in Niles, Ohio, and received his early education at the Poland Seminary, in the same state. In 1860 he entered Allegheny College, Meadville, Pa., but ill health compelled him to discontinue his studies the first year. After teaching school for a short period, he enlisted, in June, 1861, in the Twenty-third Ohio Infantry, under command of Colonel (subsequently General) W. S. Rosecrans, and

served through the war, gaining the rank of brevet major for gallantry at Antietam, Opequon Creek and Cedar Creek. He returned to Poland at the close of the war, began the study of law and was admitted to the bar in 1867.

Entering on the practice of law in Canton, Ohio, he soon became interested in politics and was known as a leading stump speaker in the state. He was elected prosecuting attorney in 1869, in 1876 member of Congress and was



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reelected successively until 1891. His service in Congress was notable for his advocacy of a high tariff, embodied in a bill called by his name, passed in 1890. He was elected governor of Ohio in 1891 and was reelected in 1893 by a majority of 80,000. His administrations as governor, though severely criticised for close relations with corporations and for exceptional regard for party advantage, were so efficient, in general, that McKinley became a popular party leader throughout the nation. In June, 1896, he was nominated by the Republican national convention at Saint Louis for president and was elected by a vote of 271 in the electoral college to 176 for William J. Bryan, his Democratic opponent. In the presidential canvass, men of both parties rallied to his support in opposition to the free silver movement represented by Mr. Bryan. His administration was notable for maintenance of a policy of expansion, both territorial and commercial, the former being emphasized by the Spanish-American war, the

annexation of the Philippines and the annexation of Hawaii, the latter by the negotiation of reciprocity treaties. The Dingley tariff law was also passed in 1897, and a bill establishing the gold standard became a law two years later.

McKinley was reelected in 1900 with increased majorities, receiving 292 of the 477 electoral votes. He had won a place in the hearts of many of his supporters as one of the most beloved of American statesmen; his second term had had an auspicious beginning, and his foreign and domestic policies were received with favor. On Sept. 6, 1901, while holding a public reception at the Pan-American Exposition at Buffalo, he was shot and fatally wounded by Leon Czolgosz, an anarchist. He died September 14 and was buried at Canton, Ohio, September 19. For five minutes at the hour of his interment, all business ceased throughout the land, and remarkable evidences of respect and affection were manifested by the peoples of other countries. As a statesman, McKinley was influenced, perhaps exceptionally, by the sentiment of his constituents, and it was rather his foresight in determining their views, than his own convictions, that made him a popular leader. However, his sincerity, his purity of character, his devotion to high ideals, and his generosity and tact well merited the prestige which he attained.

Maclaren, m'clair'en, IAN. See WATSON, JOHN.

McLaren, WILLIAM EDWARD (1831-1905), a Protestant Episcopal bishop, born in Geneva, N. Y., and educated at Jefferson College. After completing his education he began life as a journalist. Later he studied theology and was ordained a minister in the Presbyterian Church and sent as a missionary to Bogota. On his return he filled pastorates in Pittsburg, Pa., Detroit, Mich., and Peoria, Ill. He was led to change his religious views and became a minister in the Protestant Episcopal Church in 1872 and was stationed at Trinity Church, Cleveland, Ohio. Three years later he became bishop of Illinois, and when the diocese in that state was divided, he retained the northern part, known as the Diocese of Chicago. Bishop McLaren was the founder of the Western Theological Seminary, at Chicago, and Waterman Hall, a school for girls, at Sycamore, Ill. He was the author of a number of works of an ecclesiastical nature. Among them are *The Practice of the Interior Life*, *The Holy Priest* and *The Essence of Prayer*.

MacLaurin

McLau'rin, ANSELM JOSEPH (1848-1909), an American lawyer and politician, born at Brandon, Miss. He received a common school education, entered the Confederate army in 1864, and at the close of the war completed a course in Summerville Institute. In 1868 he was admitted to the bar and began practice at Raleigh, where he was soon elected district attorney. He moved to Brandon in 1876, was elected to the state legislature, was a member of the constitutional convention of 1890 and four years later was chosen to the United States Senate to fill out an unexpired term. In the following year he was elected governor of Mississippi, serving until 1900, when he was again elected to the Senate.

McLean, *mak lane'*, JOHN (1785-1861), an American jurist and politician, born in New Jersey. He removed with his parents to Virginia, to Kentucky, and finally to Ohio, where he was admitted to the bar in 1807. He served in Congress from 1812 to 1816 as a Democrat, in the latter year being elected judge of the Ohio supreme court. He was postmaster-general under President James Monroe, also under John Adams, but refused reappointment under Jackson, owing to disagreement over the principle of partisan appointment and removal. He became associate justice of the United States Supreme Court in 1830. He was a candidate for the Free-Soil nomination to the presidency in 1848 and for the Republican nomination in 1856, and he wrote a dissenting opinion in the Dred Scott case.

MacMahon, *mak ma ohN'*, MARIA EDMÉ PATRICE MAURICE DE, Duke of Magenta (1808-1893), a marshal of France, educated at the military college of Saint Cyr. He distinguished himself during the Crimean War and during the war with Austria in 1859, having much to do with the defeat of Austria at Magenta and Solferino. In the war between France and Germany in 1870, MacMahon was shut up in the town of Sedan by the German armies and was wounded in the battle before his surrender. After the war he assisted in putting down the Commune, and in 1873 he was elected president of the French Republic, a position which he occupied until 1879.

McMas'ter, JOHN BACH (1852-), an American historian, born in Brooklyn. He graduated from the College of the City of New York and soon became known as a writer on engineering subjects. He was instructor of civil engineering in Princeton; but, after six

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years, resigned to devote his whole time to the study of history and was later elected professor of American history in the University of Pennsylvania. He published a number of books of history and biography, but his most important contribution to the science is a *History of the People of the United States*. This is a very extensive work, covering the period from the Revolution to the Civil War, and appeared in seven volumes.

McMil'lin, BENTON (1845-), an American politician, born in Monroe County, Ky. He received an academic education, was admitted to the bar and was elected to the Tennessee legislature in 1874. He was for twenty years (1879-1899) a member of Congress and at the close of his service was elected governor of Tennessee and was reelected in 1901.

McMonnies, *mak mun'iz*, FREDERICK (1863-), an American sculptor, born in Brooklyn. He studied at first under Saint Gaudens and in 1884 went to Paris. His first work, a statue of Diana, was exhibited in France in 1889 and was accorded honorable mention. His best known works are the *McMonnies Fountain*, at the World's Columbian Exposition in Chicago, in 1893; *Sir Harry Vane*, in the Boston Public Library, and *Shakespeare*, in the Congressional Library at Washington. After 1900 McMonnies devoted himself to painting.

Macomb, *ma koom'*, ILL., the county-seat of McDonough co., 65 mi. n. w. of Springfield, on the Chicago, Burlington & Quincy railroad. The city is in a productive agricultural region and has a considerable trade in farm produce, coal and lumber. Fire clay is found in abundance, and the manufacturing of clay products is the most important industry. The Western Illinois State Normal School is located here, and the city has a public library. Population in 1910, 5774.

Macomb, ALEXANDER (1782-1841), an American soldier, born in Detroit, Mich. He entered the cavalry service of the army in 1799 and had become adjutant general at the outbreak of the War of 1812. During this struggle he served with the artillery and by January, 1814, had become brigadier general, in command of the northern frontier. There, in September, he fought the Battle of Plattsburg, near Lake Champlain, simultaneously with McDonough's famous battle on the lake. For this service he was made major general and received the thanks of Congress, as well as a gold medal. From

1828 until his death he was commander in chief of the United States army.

Macon, *ma' kon*, GA., the county-seat of Bibb co., 100 mi. s. e. of Atlanta, on the Ocmulgee River and on the Central of Georgia, the Southern, the Georgia Southern & Florida and other railroads. It is the fourth inland cotton market in the country and ships large quantities of fruits, vegetables and other produce. The manufacture of cotton products is the most important industry. There are also railroad shops, lumber mills, kaolin mines, foundries and manufactures of clay products, furniture and other articles. The important educational institutions are Saint Stanislaus College, Mercer University, Mount de Sales Academy, the state academy for the blind and Wesleyan Female College, one of the oldest colleges for women in the United States. The place was settled in 1822 and was chartered as a city in 1832. Since 1900, two adjoining suburbs have been annexed, nearly doubling its size. Population in 1910, 40,665.

McPherson, *mak jur' son*, JAMES BIRDSEYE (1828-1864), an American soldier, born at Sandusky, Ohio. He graduated from West Point at the head of his class in 1853 and was appointed to the engineering corps. At the outbreak of the Civil War he entered the Federal service under General Halleck and was made lieutenant colonel. He took an active part in the expedition against Fort Donelson and Fort Henry and at the Battle of Shiloh, as chief of engineers on General Grant's staff. He was made major general of volunteers for services at Corinth, and he served with distinction in the Vicksburg campaign, being made brigadier general in the regular army. Later he became commander of the Army of the Tennessee and took a conspicuous and important part in Sherman's march to Atlanta. He lost his life in a gallant attack upon Atlanta in July, 1864.

Macready, *mak re' dy*, WILLIAM CHARLES (1793-1873), an English tragedian, born in London. In 1826 he made his first visit to America and in 1828 played in Paris, meeting with great success in both countries. He revisited the United States in 1843 and 1848, and during his last visit he was the victim of a riot in Astor Place, New York, stirred up by his rival, Edwin Forrest. For a time Macready held the management of the Covent Garden Theatre and later that of Drury Lane. He retired from the stage in 1851. Although lacking somewhat in fire and enthusiasm, Macready

was recognized as one of the great actors of his time.

Mac Veagh, *mak vay'*, WAYNE (1833-), an American lawyer and politician, born in Chester County, Pa. He graduated at Yale in 1853 and was admitted to the bar in 1856. After serving as prosecuting attorney, he took part in the defense of Pennsylvania during the Civil War, and in 1872 was appointed minister to Turkey. President Hayes placed him at the head of a commission to investigate conditions in Louisiana in 1877, and Garfield appointed him attorney-general in 1881. He supported Cleveland for president in 1892 and was appointed minister to Italy in the following year. In 1903 Mac Veagh was chief counsel for the United States in the Venezuela controversy before the Hague tribunal.

Mad'agas'car, a large island in the Indian Ocean, 230 mi. from the east coast of Africa, from which it is separated by Mozambique Channel. Its length is about 980 miles, its greatest breadth, 358 miles, and its area, including a few islets, 228,500 square miles. Madagascar may be described as an elevated region, with an average height of from 3000 to 5000 feet, overlooked by mountains rising in some cases to nearly 9000 feet. The coast exhibits a number of indentations, with several very fine natural harbors in the northwest. The rivers are numerous, yet few of them offer even to a moderate extent the advantages of internal navigation. The climate is oppressively hot on the coast, but it is temperate on the highlands of the interior, and the island is unhealthful for Europeans only in the neighborhood of lagoons or marshes. The rainy season continues from December to April.

The trees of Madagascar include palms, ebony, mahogany, fig, cocoanut and the ravinala, or traveler's tree, which when pierced yields a refreshing juice. The vegetable products grown for food include rice, manioc, or cassava, sweet potatoes, ground nuts and yams. Ginger, pepper and indigo grow wild; cotton, sugar cane, coffee, tobacco and hemp are cultivated. India rubber, gum copal and dyewoods are exported. Humped cattle are found in immense herds, and form a large part of the wealth of the inhabitants. There are also sheep, goats, swine and horses. The most characteristic of the wild animals are the lemurs (See LEMUR). Birds are numerous; snakes are rare; crocodiles, lizards and chameleons abound.

The inhabitants, called Malagasy, belong to

the Malayo-Polynesian stock and speak a Malayan language. The Hovas are the ruling tribe, having extended their sway over nearly the whole island, while the other chief tribes are the Betsimisarakas, the Betsileos and the Sakalavas. In the coast districts the houses of the better class are built of framed timber and have lofty roofs; the dwellings of the lower classes are constructed of bamboo or rushes, or even of clay. The Malagasy show much aptitude as silversmiths, gunsmiths and carpenters, and with rude looms they make handsome cloths. The religion of the great bulk of the people is a kind of fetishism, or worship of charms. Many of their superstitious customs have been abolished, and Christianity has been adopted, chiefly by the Hovas, but polygamy and infanticide are still practiced. The government is an absolute monarchy, but it is subject to France. The capital is Antananarivo. Population in 1911, 3,104,881.

Madagascar was known to Marco Polo at the end of the thirteenth century, and in 1506 it was visited by the Portuguese, who gave it the name of Saint Lorenzo. In the latter part of the seventeenth century and during the most of the eighteenth century, the French had the ascendancy in the island, but the English gained the supreme influence early in the nineteenth century. In the year 1810 Radama I became king of the Hovas, and with his approval Christian missionaries began to teach in the capital in 1820. Many converts were made, the Bible was translated into the Malagasy tongue, the language was reduced to a systematic written form and printing was introduced. In 1828 Radama was succeeded by his chief wife, Ranavalona I, a woman of cruel disposition, who persecuted the Christians and closed the island to Europeans. She was succeeded in 1861 by her son, Radama II, who reopened it to the missionaries and emancipated the African slaves. He also granted extensive territories and privileges to France, an act which offended his chiefs and led to his assassination in 1863. His wife occupied the throne five years, and she was succeeded by Ranavalona II, who became queen in 1868. Under her, Christianity became the State religion. The government, jealous of foreign influence in the island, invaded French territory in 1883, and the result was a struggle which lasted for two years. By a treaty in 1885, Madagascar was virtually placed under French protection, and eleven years later it was declared a colony of France. In 1897, France emanci-

pated the slaves of the Hovas and in the same year was obliged to put down a serious rebellion.

Mad'der, a genus of plants native in almost all tropical regions. From the roots of a species which is grown extensively in Holland is obtained a beautiful red coloring matter, which in one shade is known as *turkey red*. The chief coloring matter in the different madder dyes is called alizarin. *Common madder* is a native of southern Europe and Asia, though cultivated in most European countries. It has black fruit and small, greenish-yellow flowers. *Cinchona* trees and coffee trees are members of this family, and in the United States the common bluets and button-bush are representatives. The madder family has about 4500 species. See DYEING.

Madeira, *ma de' rah*, Portuguese island in the North Atlantic, about 400 mi. from the coast of Morocco. Its length is about 38 miles, its breadth, 12 miles, and its area, 315 square miles. The island is traversed by a central mountain ridge, the highest point of which is over 6000 feet. The chief product of Madeira is wine, for which it has long been famous, and of which it exports yearly about 700,000 gallons. The climate is equable, and the island is considered an excellent health resort. The capital and chief center of trade is Funchal. Madeira was colonized by the Portuguese in the early half of the fifteenth century. Population in 1911, 169,777.

Madeira River, a large river of South America, the largest tributary of the Amazon. It is formed by the union of the Beni, the Mamoré and the Guapore, on the frontiers of Brazil and Bolivia. With the Mamore its length is about 2000 miles, and it is navigable for almost half of this distance. East of the Bolivian frontier the navigation is interrupted by cataracts, but beyond the cataracts it is again navigable.

Madero, *mah dair' oh*, FRANCISCO (1873-1913), a Mexican soldier and politician, born in Coahuila. Until 1900 Madero remained in Coahuila, where he supervised the estate of his grandfather, a wealthy landowner. Here he introduced modern methods of agriculture, and generally showed himself an able though occasionally impracticable idealist. In 1900 he moved to Mexico City, where he immediately became a prominent opponent of President Diaz and his policies. In 1910 appeared his book *The Presidential Succession of 1910*, a statement of proposed reforms, and Madero himself became a candidate for the presidency. He was kept

Madison

in jail a short time before the election. On his release he instituted the revolution which resulted in the resignation and voluntary exile of Diaz in May, 1911, and Madero's accession as president on November 6. Though devoted to justice and civic righteousness, Madero lacked the strength of character to control the situation. A number of opposing elements finally forced his resignation on February 14, 1913, and on February 22 he was killed. It seems certain that he was executed with the consent, and probably by the orders, of General Huerta. See MEXICO, subhead *History*.

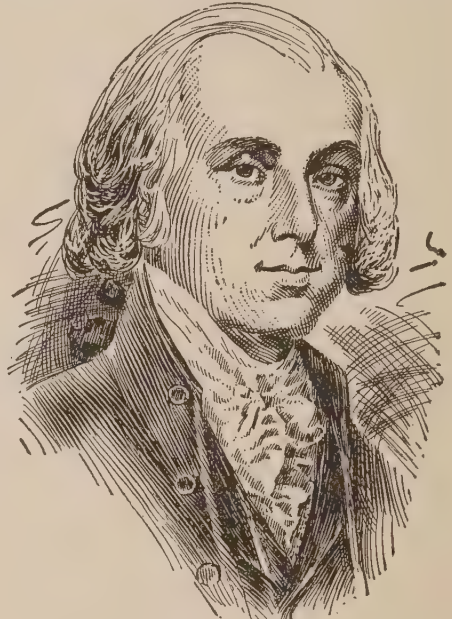
Madison, IND., the county-seat of Jefferson co., 50 mi. n. e. of Louisville, Ky., on the Ohio River and on the Pittsburg, Cincinnati, Chicago & Saint Louis railroad. The city has a large river trade and contains shipbuilding and lumber yards, foundries, machine shops, tanneries and cotton and woolen mills. It has public and parish schools and Saint Gabriel's Academy. Madison was first incorporated in 1824. Population in 1910, 6934.

Madison, Wis., the capital of the state and the county-seat of Dane co., 83 mi. w. of Milwaukee, on the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul and the Illinois Central railroads. It is situated in the region of three beautiful lakes, and has many attractive drives and parks. The city also provides for recreation grounds. It has several imposing buildings, including the new state capitol, the building of the State Historical Society on the state university campus, which contains the state historical library and museum, the university library and the library of the Academy of Arts, Letters and Science, and the modern high school building, erected in 1909. In addition to the libraries already mentioned there is a Carnegie public library and a state law library. The total number of bound volumes in all these libraries is about 404,000; besides, there are about 202,000 pamphlets and many original documents and manuscripts. The chief educational institutions are the state university (See WISCONSIN, UNIVERSITY OF), the public high school, the Wisconsin Academy and the Sacred Heart Academy, a girls' school conducted by the Dominican Sisterhood. A state asylum for the insane is situated on Lake Mendota, near the city. The factories are developing rapidly. The manufactures include agricultural implements, machinery, tools, flour, boots and shoes and electrical appliances. There are also numerous printing establishments. In 1836 the city of

Madison

Madison was chosen for the state capital, and since 1839 it has been the regular seat of government. It was chartered as a city in 1856. Population in 1910, 25,531.

Madison, JAMES (1751-1836), an American statesman, fourth president of the United States. He was born at Port Conway, Va., and was educated at Princeton College, at first with the intent of entering the ministry, later in preparation for a legal career. He served in minor



JAMES MADISON

local public offices until 1776, when he was a member of the Virginia constitutional convention. There he vigorously advocated the granting of absolute religious freedom and thus displayed for the first time his natural democratic inclinations. He became a member of the first state assembly, but was defeated at the end of the term by corrupt means. In 1780 he was sent by the state to the Continental Congress.

Returning to his state in 1784, he again was elected to the legislature, where he labored diligently toward the upbuilding of a strong union of the colonies, in order to secure for all the necessary stability and prestige. In the constitutional convention of 1787 he was a leading figure, though, being secretary of the convention, he did not take a conspicuous place in the debate. On account of his service, he was afterward called the "Father of the Constitution." As a contributor to the *Federalist*, with

John Jay and Alexander Hamilton, he did much to secure the ratification of the Constitution by the states, especially New York and Virginia. In 1789 he was elected to the national House of Representatives, where he remained eight years. Though elected as a Federalist, he soon found himself in opposition to Hamilton, and he eventually became a leader of the Anti-Federalist, later Republican, and still later, Democratic, party.

After his retirement from Congress, Madison for a time did not show active interest in political affairs, though it is believed that the Virginia Resolutions of 1798 (See KENTUCKY AND VIRGINIA RESOLUTIONS) were written by him. When Jefferson became president in 1801, he chose as his secretary of state, Madison, who was his warm personal friend. Madison retained the office for eight years, until he himself was elected president. Though not displaying remarkable powers as a diplomat or an executive, Madison's term at the head of the state department showed him to be a man of firm convictions and perfect integrity.

When he became president in 1809, the foreign affairs were in a serious state, and throughout his first term he was confronted by some of the most serious diplomatic problems in the history of the country. He was unsuccessful in attempting to apply his theory that foreign nations can be brought to terms by depriving them of American trade. When the war was forced upon him, he devoted himself to its prosecution, but proved not to be an efficient executive. However, he was reelected in 1813, his second term being filled with controversies over internal taxation, the establishment of the United States Bank, which was finally carried in 1816, and the tariff, in which a protective principle was incorporated for the first time in the same year.

At the close of his term, Madison retired to his estate at Montpelier, Va., where, though living quietly, he maintained a strong influence upon his party and upon political events in general. His wife, Mrs. Dorothy Paine Todd Madison, was perhaps the most popular mistress that the White House has ever known, being familiarly called "Dolly" Madison. See Gay's *James Madison* in American Statesmen Series.

Madon'na, a term now commonly used in all languages to refer to the Virgin in works of art. It was not until after 431 A. D., when the Council of Ephesus declared the Virgin Mary to be

the Mother of God, that she was frequently represented in art, but after that time the number of paintings increased rapidly. In early art she was painted with a robe of blue, starred or marked with gold and usually draped over her head. Byzantine models were followed up to the thirteenth century, when the revival of painting in Italy brought more natural and beautiful forms. Fra Filippo Lippi was the first to portray the incarnation of maternal love and childish innocence. Botticelli's two best productions represent the Virgin crowned and adored by dreamy angels. Only two of Leonardo da Vinci's Madonnas remain, both of which are charming representations. The Umbrian painters left striking and beautiful pictures of the Madonna, one of the best of which is the *Madonna Enthroned*, by Dosso Dossi, now in the Cathedral at Ferrara. Of Venetian painters, Giovanni Bellini and Titian stand out most prominently, and Titian's *Pesaro Madonna* in the Church of Frari, Venice, is the most celebrated. Of all the Italian painters of Madonnas, Raphael was the greatest. In his early period his theme was Mary the mother, while later he represented her as queen of heaven. Of his fifty or more excellent Madonnas, the most celebrated are the *Madonna of the Chair* and the *Sistine Madonna* (See below).

The artists of northern Europe did not produce many famous Madonnas, and of these, few remain. The first in rank of the German Madonnas is the *Madonna of Burgomaster Meyer*, at Darmstadt, the work of Holbein. Rubens and Van Dyke also furnished excellent examples. Murillo is the representative Spanish painter, and his best works are to be seen in the Pitti Gallery, Florence, in the Corsini Palace in Rome and in the Louvre, Paris.

A few of the famous Madonnas now in the galleries are the following:

Madonna di Ansidai, by Raphael (1506), the finest in England, in the National Gallery, London. Sometimes it is called the *Blenheim Madonna*, because it was purchased there in 1844 for \$350,000.

Madonna del Baldacchino (Madonna of the Canopy), by Raphael (1508), in the Pitti Palace, Florence. The Virgin, enthroned under a canopy, the curtains of which are raised by angels, sits with Jesus in her lap.

Belle Jardiniere (Pretty Gardener), by Raphael (1507), in the Louvre. The Virgin, seated in a meadow among flowers, is looking at the infant

Madras

Jesus, who stands at one knee; at the other, Saint John kneels, holding a cross.

Madonna de Candelabri or *Madonna de la Candelabras*, by Raphael (1516-1517), in London. On one side of the Virgin, who holds the infant Jesus, is a burning torch held by an angel. Because this was formerly in the Borghesi Palace it is sometimes called the *Borghesi Madonna*.

Madonna of the Basket, by Correggio (1520), in the National Gallery, London.

The *Sistine Madonna*, by Raphael (1518), now in the Dresden Gallery, Germany. It represents the Virgin supported on clouds and carrying the child Jesus in her arms. On one side Pope Sixtus II kneels in supplication. At the other side kneels Saint Catherine, and below, the two famous cherubs of Raphael are leaning. This picture was painted as an altar piece for the Church of San Sisto at Piacenza, and it was finished just before Raphael's death (See RAPHAEL).

Madonna of the Rocks, by Leonardo da Vinci, in the National Gallery, London. It takes its name from the appearance in the background of a grotto, with high rocks. The Virgin is presenting the infant John to Jesus, who, supported by an angel, is blessing him.

Madonna of the Rosary, by Domenichino, in the Bologna Gallery. Other paintings of the same name have been done by Murillo, Caravaggio and Van Dyke.

Madonna of the Chair (*Madonna della Sedia*), by Raphael (1516-1517), in the Pitti Palace, Florence. The Virgin is seated in a chair, clasping Jesus in her arms, while Saint John is depicted in adoration at the left.

Madras', a maritime city of British India, capital of the province of the same name, on the Coromandel coast. It is ill-situated for commerce, standing on an open surf-broken shore, with no proper harbor, though an area has been enclosed by piers so as to shelter a certain amount of shipping. Despite drawbacks, however, Madras carries on an extensive commerce, being the terminus of railways from Bombay and the south, while it is also the headquarters of all the province departments. There are no manufactures worthy of mention, but the export and import trade amounts to millions of dollars annually. Madras was founded in 1639 by the English, and it soon became their chief settlement on the coast. It was taken by the French in 1746, but three years later it was restored to the English. Population in 1901, 509,397; about one-tenth are Christians.

Madrid

Madras, a province of British India. With its dependencies, it comprises the extreme southern part of the peninsula of India. Its area, not including the native states, is 141,726 square miles. It is surrounded by the sea on every side except the north, on which side it is bounded by Orissa, the Central Provinces, the territory of Hyderabad and Mysore. The chief rivers are the Godavery, the Kistna and the Kavery. The climate of Madras is varied. The soil is sandy along the coast, but there are many fertile districts; iron, copper, lead and coal are found in considerable quantities. There are extensive forests in the province, yielding teak, ebony and other valuable timber trees. The principal vegetable products are grains, sugar cane, yams, plantains, tamarinds, mangoes, melons, cocoanuts, ginger, tobacco, oil, seeds, coffee and cotton. The most common wild animals are the elephant, the tiger, the jackal, the wild hog and the ibex. The population in 1911 was 41,405,404, and the native protected states have in addition a population of 4,811,841.

Madrid', the capital of Spain, in New Castile, in the Province of Madrid, on the Manzanares, near the center of the Iberian Peninsula. Situated upon a high plateau, 2150 feet above the sea, wind-swept from the snowy Guadarama, with unhealthful extremes of temperature, the city has no advantages except the fanciful geographical merit of being in the center of Spain. The principal streets are broad, long and airy, but the squares are generally irregularly built and deficient in decorative monuments. The royal palace, a combination of Ionic and Doric architecture, is one of the most magnificent palaces in the world. It contains a small but splendid Corinthian chapel, a library of nearly 100,000 volumes and a fine collection of ancient armor and coins. The bull fights take place in the Plaza de Toros (bull ring), a building which is about 1100 feet in circumference and which is capable of seating 13,000 spectators. The Prado, a boulevard on the east of the city, is one of the finest promenades in Europe, and beyond it is the park. The Royal Museum of Painting and Sculpture, in the Prado, contains more than 2000 pictures, many of them by the greatest masters of painting, especially those of Spain. The National Library, founded by Philip V, contains over 600,000 volumes. The university has an average attendance of 5000 students, and there are numerous colleges and medical, military and



THE SISTINE MADONNA — *Raphael*
Dresden, Germany

Madura

law schools. The manufactures are of small value, although there is a large tobacco factory. Madrid began to be a place of importance under Charles V, and in 1561 Philip II made it the capital. Population in 1910, 571,539.

Madura, *ma doo'ra*, an island of the Indian Archipelago, n. e. of Java, from which it is separated by the Strait of Madura. Its area is about 1700 square miles. It is not very fertile, but maize, cocoanuts, tobacco, Jamaica pepper and tamarinds are produced to some extent. The chief industry is cattle raising. The inhabitants, mostly Mohammedans, are governed by native princes. Population, 1,630,510.

Maelstrom, *male'strom*, or **Malström**, the name of a tidal current or whirlpool off the northwestern coast of Norway, immediately southwest of the most southerly of the Lofoten Islands. The current is caused by the ebb and flow of the tides through the channel, producing an immense whirling motion. Formerly the water was supposed to be of such depth that it could not be sounded, but later explorations show that the depth does not exceed 20 fathoms. This whirlpool has been the subject of numerous legends by both medieval and later writers. When the wind is northwest it is at its worst at either high or low water, and under these circumstances it cannot be passed over with safety, but at other times boats traverse it safely.

Maeterlinck, *met'ur link*, MAURICE (1862-), a Belgian poet, born in Ghent. His dramas, on which his fame largely rests, include *Monna Vanna*, perhaps his greatest work; *The Princess Maleine*, *The Blind*, *The Intruder* and *Home*. These plays, mystical and symbolic, are, with the exception of *Monna Vanna*, not well adapted for presentation on the stage. His characters are not living human beings, but simply figures which the poet uses to express his morbid views on life and death. Another kind of work in which he has been exceedingly successful is essay writing. *The Treasure of the Humble*, *Wisdom and Destiny*, *Our Friend the Dog* and *The Life of the Bees* are charming studies. In 1911 Maeterlinck received the Nobel prize for literature.

Mafia, *mah'fe ah*, a Sicilian secret society, whose object is to protect its members from punishment for any crimes they may commit. Nothing is known definitely of its origin or its organization, and it is believed that there is not a very strict, systematic organization. The members take oath to obey their leader in all things, to keep the secrets of the order, never to

Magdeburg

go to law for any grievance and to help their fellow members under all circumstances. Branches of the Mafia exist in various cities of the United States. When in 1890 the chief of police in New Orleans was murdered, the crime was laid to the Mafia, eleven of whom were put in jail. The jail was broken into, and the prisoners were murdered by a mob, and the affair came near leading to complications with the Italian government.

Magazine, *mag a zeen'*, a protected room, used for the storage of ammunition. On land the magazines are usually underground or have shell-proof defenses. The magazines of war ships are placed below the water line, as far as possible away from the engines and near to the guns. They are so constructed that they may be flooded in case of accident and are kept cool by currents of air and water. The light all comes from above, through glass windows. Iron fittings are not used anywhere in the magazines, and the ammunition handlers do not wear metal on their clothing or shoes. The opening to the magazine proper is small and is communicated with by a handling room, into which the ammunition is passed in small quantities and from which it is taken with cars and tackle to the guns.

Mag'dalen or **Magdalene**, MARY, that is, Mary of Magdala. She is mentioned in the New Testament as having had seven devils cast out of her, as watching the crucifixion and as having come early to the sepulcher on the resurrection morning. She was erroneously identified as the "woman who was a sinner" (*Luke VII, 37*), and hence the term Magdalen came to mean a penitent fallen woman.

Mag'dale'na, a river of South America, which rises at the frontier of Ecuador, flows generally north through Colombia, and empties into the Caribbean Sea by several mouths. Its length is about 950 miles, and it is navigable as far as Honda, about 600 miles.

Mag'dalen Islands, a group of islands in the Gulf of Saint Lawrence, 54 mi. n. w. of Cape Breton Island. The inhabitants, about 5000 in number, depend for their support chiefly upon the fisheries. Lobster, cod, herring and seal are taken in great numbers.

Magdeburg, *mah'g'de boorK*, the capital of Prussian Saxony, a fortress of the first class, on the Elbe, 76 mi. w. s. w. of Berlin. The city is chiefly on the left bank of the river, which here divides into three arms. The fortifications

comprise the citadel and a number of detached forts and redoubts. Among the chief buildings are the Cathedral of Saints Maurice and Catharine, the churches of Our Lady, Saint Ulrich and Saint Paul, the Synagogue, the Rathaus and the old royal palace. The manufactures are varied, embracing machinery, castings, armor plates, chemicals, spirits, pottery, sugar, beer, cottons, ribbons, leather and tobacco. Of the beet sugar industry Magdeburg is the chief center in Germany. The trade is extensive, both by rail and river. Magdeburg was first prominent in the tenth century, when it became the seat of an archbishop. It early distinguished itself in the Reformation. During the Thirty Years' War the town was besieged, stormed and sacked by Tilly, and 20,000 persons are said to have been murdered. Population in 1910, 279,629.

Magellan, *ma jell'an*, or **Magalhães**, FERDINAND (about 1470-1521), a Portuguese navigator, who conducted the first expedition around the world. He served in the Portuguese army in the Indies for a time, but was not well rewarded and offered his services to Spain. In 1519 he received the command of a fleet of five ships, with which he sailed westward, entered the straits since called by his name and discovered the Pacific Ocean. Subsequently he was killed in a skirmish with the natives on one of the Philippines, but one of his vessels completed the journey to Spain.

Magellan, STRAIT OF, the strait which separates the continent of South America from the islands of Tierra del Fuego. It is over 350 miles long and varies in breadth from 2 to 70 miles; it forms communication between the South Atlantic and South Pacific oceans. The number of obstructing islands makes the channel difficult of navigation. The strait was discovered in 1520 by Magellan, for whom it was named.

Magenta, *ma jen'ta*, BATTLE OF, a famous battle which took place on June 4, 1859, between the French and Sardinians, under Napoleon III and Victor Emmanuel, and the Austrians. The victory, which was with the allies, was due largely to the bravery and brilliant tactics of Marshal MacMahon.

Maggiore, *ma jo'ray*, LAKE, or **Lago Maggiore**, a lake partly in northern Italy, partly in Switzerland, 37 miles in length and averaging 2 miles in breadth. It is 635 feet above the level of the sea and is in some places considerably over 1000 feet deep. Its banks

are highly picturesque, and it is surrounded on all sides by hills.

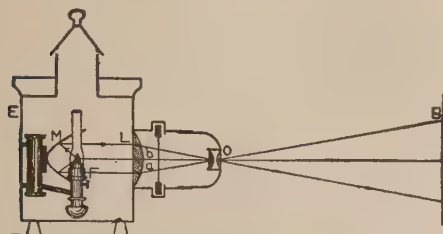
Magi, *ma'ji*, the hereditary priests among the Medes and Persians, set apart to manage the sacred rites and to preserve and propagate the sacred traditions, acting also as diviners and astrologers. They possessed great influence, both in public and private affairs, conducted the education of the princes and were constant companions of the monarchs. Their order was reformed by Zoroaster, who compelled them to live the severe and simple lives that the law had laid down for them. The name *magi* came also to be applied to holy men or sages in the East. The wise men that came from the East to worship Jesus were magi, whose names given by tradition were Melchior, Balthasar and Gaspar. It is claimed their bones are in the Cathedral of Cologne. One of the men in works of art is represented as a black man. See EPIPHANY.

Magic, *maj'ik*, the art or pretended art or practice of producing wonderful effects by the aid of superhuman beings or of departed spirits or the hidden powers of nature. A large proportion of magical rites are connected with the religious beliefs of those using them, their efficiency being ascribed to supernatural beings. There is, however, an element in magic which depends on certain imagined powers and natural powers, that can be utilized in various ways. In savage countries the native magician is often sorcerer and priest, and sometimes chief of the tribe. Among the ancient Egyptians magic was worked into an elaborate system and ritual, and it was regularly practiced among the Babylonians and Assyrians, as well as in Greece and Rome. Alexandria, from the second to the fourth century, became the headquarters of a system of magic, in which invocations, sacrifices, diagrams and talismans were systematically employed. The term is also, though wrongly, applied to the operations of sleight-of-hand performers.

Magic Lantern or **Stereop'ticon**, an instrument used for projecting upon a screen a highly magnified image of a transparent picture or some other object. The important parts of the magic lantern are (1) the box, *E*, which may be of wood or metal, but must be light-tight and must contain a chimney and openings for the admission of the air; (2) the light, *F*, back of which in some lanterns there is a concave mirror, *M*; (3) the condenser, *L*; (4) the slide or picture to be magnified, *a b*; (5) the magnifying glass or objective, *O*. The condenser collects

Magic Square

the rays of light from the lamp and concentrates them upon the slide. As they pass through the object glass they are caused to expand and produce an enlarged image of the picture upon the screen, *B*. Since the rays cross in the object glass, the image is inverted, and in order to have it appear erect the slide must be placed in



MAGIC LANTERN

the lantern in an inverted position. The light employed in the best instruments is the calcium, or lime, light, or the electric light. The magic lantern is extensively used as an educational appliance, in teaching geography and history in elementary schools and for scientific purposes in high schools and colleges.

Magic Square, a continuous series of numbers, arranged in a square, in such a manner that the sum of the figures in each column or row is equal to that in each of the others. The following is a simple magic square. In this case the sum is 34.

1	14	15	4
12	7	6	9
8	11	10	5
13	2	3	16

Magna Charta, *mag'na kahr'tah*, or **Great Charter**, a document forming part of the English Constitution and regarded as the foundation of English liberty. It was extorted from King John by the confederated barons in 1215. Its most important articles are those which provide that no freeman shall be taken or imprisoned or proceeded against except by the lawful judgment of his peers or by the law of the land; and that no scutage or aid shall be imposed in the kingdom (except certain feudal dues from tenants of the crown), except by the common council of the kingdom. The remaining and greater part of the charter is directed against abuses of the king's power as feudal superior. The charter was confirmed several

Magnetic Needle

times during the reigns that succeeded John's and the form adopted in the reign of Edward I was set down in the statute books. The most accurate and complete copy of the original charter is that preserved in Lincoln Cathedral. The board of commissioners on the public records ordered a facsimile of it to be engraved and it has been frequently translated into English.

Magnesia, *mag ne'zhe ah*, the oxide of magnesium, a white, tasteless, earthy substance of an alkaline nature. It is almost insoluble, is absorbent and is a mild cathartic remedy. In commerce, pure magnesia is generally distinguished by the term calcine of magnesia, and it is readily obtained by exposing *magnesia alba* to a red heat.

Magnesian Limestone. See DOLOMITE.

Magnesium, *mag ne'zhe um*, a silvery-white metal, with a brilliant luster. It is very malleable and fuses at a red heat. Although magnesium is not found separate in a state of nature it is one of the widely distributed elements in such mineral compounds as chrysolite, dolomite, hornblende, serpentine, soapstone, tourmaline and meerschaum. Heated to redness in oxygen gas, it burns with brilliancy, and combining with the oxygen, it becomes magnesia, or the oxide of magnesium. A magnesium light is rich in chemical rays and is now employed to some extent in photography. The chief salts are the carbonate, the chloride, the sulphate (See ERFON SALTS), the phosphates and the silicates.

Magnet, a substance which has the power of attracting iron, steel, nickel and cobalt. Magnets are natural or artificial. *Natural* magnets are pieces of iron ore called magnetite and have strong magnetic properties. They are also known as loadstones or lodestones. *Artificial* magnets are those made by magnetizing iron or steel. The force of a magnet is strongest at the ends, which are called the *poles*. The horse-shoe magnet is U-shaped. A piece of soft iron placed across the ends and held in place by the force of magnetism, is called the armature. A bar magnet is straight. An electro-magnet is one made by an electric current. For an understanding of the properties and uses of magnets, see MAGNETISM.

Magnetic Needle, a small bar magnet, suspended so as to move freely in a horizontal direction. The needle points nearly due north and south. The north end is called the north pole, and the south end, the south pole. See COMPASS; MAGNETISM.

Mag'netism, the power possessed by a magnet, by means of which it attracts iron and steel. Magnetism was known for centuries before it was applied to any practical use. It was first discovered in a variety of iron ore found near Magnesia, in Asia Minor; hence, the name *magnet*. This ore, commonly known as magnetic iron or magnetic iron ore, is found in many parts of the world, but it occurs in large quantities in the Scandinavian peninsula and in Siberia. However, only very small portions of it possess the power of magnetism to any extent. These pieces are commonly known as *loadstones*. A piece of loadstone forms a *natural magnet*, while a piece of iron or steel which has been magnetized forms an *artificial magnet*.

A magnet can be made by taking a piece of iron or steel and rubbing it with a loadstone or an artificial magnet. Magnetism is imparted to soft iron quickly, but when the magnet is removed the force disappears. It requires considerable time to magnetize hard steel, but when magnetized it retains its magnetism for a long time. The magnetic force is manifested at the ends of the magnet, which are called *poles*. This is illustrated by placing a bar of magnetized steel in a box of iron filings. The filings will adhere to each end, but will not adhere to the middle of the bar. When a bar magnet is suspended in a horizontal position so that it can move freely, it always points nearly north and south. For this reason the end pointing to the north is called the north (+) pole, and the end pointing south, the south (—) pole. The magnetism of the two poles is different, and when poles of the same name are brought together they repel each other, while those of different names attract each other. If the north poles of two bar magnets approach each other and the magnets are free to move upon a point of suspension, they will turn in opposite directions. The *magnetic needle* is a small bar magnet suspended horizontally upon a point; it is always found in the compass. The space over which a magnet exerts influence is called the *magnetic field*. If a piece of soft iron, as a tack or a staple, is brought within this space, it becomes magnetized by induction, but loses its magnetism as soon as it is removed from the field. All magnets lose their power if left without protection. For this reason, a piece of soft iron, called the *armature*, should be placed across the end of a horseshoe or U-shaped magnet when it is not in use, and bar magnets should be laid

side by side so that the north pole of one will be next the south pole of the other, and armatures should then be placed across each end.

The exact nature of magnetism is still a subject of investigation and discussion. Ampere's theory of the practical identity of electricity and magnetism is now very generally discredited. No other has yet taken its place in good standing. See ARMATURE; ELECTRO-MAGNETISM.

Mag'netite or **Magnetic Iron Ore**, an ore of iron, containing a large proportion of oxygen and exhibiting magnetic properties. It is of an iron-black color, has a metallic luster and is very hard. Magnetite is one of the most valuable of iron ores, since its addition to other ores greatly improves the quality of the iron produced. It occurs in massive form and in sand. The largest quantities are produced in Sweden. When occurring in sand, it can often be obtained in paying quantities by washing the sand in sluices, across the bottom of which small bars of wood are placed at frequent intervals. The magnetite is heavier than the sand and sinks to the bottom. After the water is shut off it can easily be collected.

Mag'neto-Elec'tric Machine, a machine for generating electricity by magnetism. In the ordinary machine an electro-magnet, called the armature, is caused to rotate near the poles of a powerful fixed magnet, in such a manner that the core of the armature becomes magnetized first in one direction and then in the opposite, by the inductive action of the poles of the fixed magnet. Every change in the magnetization of the core induces a current in the coil wound upon it. Hence currents in alternately opposite directions are excited in this coil, their strength increasing with the speed of rotation. It is now usual in powerful machines of this class to employ electro-magnets as the fixed magnets, and the current which feeds these fixed magnets is often the current generated by the machine itself. The machines in this case are called dynamo machines. This name was originally confined to machines which thus supply the current for their own field magnets; but it is now applied to any machine in which the field magnets are electro-magnets. Such machines, of which there is an enormous variety, driven by steam engines or other powerful motors, are now almost universally employed when electric currents are required on a large scale, as in electric lighting. See DYNAMO; ELECTRO-MAGNETISM.

Magnif'icat, the song of the Virgin Mary, *Luke* 1, 46-55, so called because it commences

Magnolia

with this word in the Latin *Vulgate*. It is sung throughout the Western Church at vespers, or evensong.

Magno'lia, a genus of trees and shrubs, remarkable for their rich green foliage and large, beautiful flowers. There are more than a dozen species, most of which are natives of subtropical Asia and North America, but they have been long cultivated extensively in the warmer parts of Europe. The *great-flowered magnolia* is the



MAGNOLIA

most beautiful of several species that are native to the Southern states. This is a tree of great size and perfect shape, with large, evergreen leaves, splendid, fragrant, white flowers and scarlet cones. These cones, which are the fruit of the plant, open when they are ripe, and the bright red seeds hang suspended from fine threads like cobwebs. The *cucumber tree*, the *melon tree*, the *mountain magnolia* and the *sweet bay*, the *white laurel* and *swamp sassafras* are other native species. See *TULIP TREE*.

Mag'pie, a bird of the crow family. There are several species, two of which belong to



MAGPIE

America and are found from the Arctic regions to California. The American magpie is a handsome black and white bird and a determined robber of other birds' nests. The European magpie is a fine, black bird, with white patches on its belly and shoulders. It is celebrated for its crafty instincts, its power of imitating words,

Mahanadi

its continuous chatter and its habit of stealing every glittering article it sees.

Magru'der, JOHN BANKHEAD (1810-1871), an American soldier, born in Virginia. He graduated at West Point in 1830, took an active part in the Mexican War and when the Civil War broke out joined the Confederate army, with the rank of brigadier general. Later in the same year he was made major general. He did good service throughout the war, and at its close he served in the imperial army in Mexico until the overthrow of Maximilian.

Mahabharata, *ma hahb'hah'rah tah*, (literally, "the great history of the descendants of Bharata"), an ancient Indian epic of about 220,000 lines, divided into eight books, the leading story of which narrates the history of the war between the Kauravas and the Pandavas for the possession of the ancient kingdom of Bharata, which is said to have comprised the greater part of India. The Pandavas, who are represented as incarnations of heroism and goodness, are finally victorious. The authorship of the epic is attributed to Vyāsa, "the arranger," but this simply means that the materials of which the poem consists were at some time or other welded together with a certain order and sequence so as to form one work.

Mahan', ALFRED THAYER (1840-1914), an American naval officer and author, born at West Point, N. Y. He graduated from the United States Naval Academy and at once entered the navy, serving until he was retired in 1896 at his own request. For several years he was president of the Naval War College at Newport; he was a member of the naval board of strategy during the war with Spain, and the next year he was one of the American representatives to the peace conference at The Hague. He has written a number of historical works, of which the most important are his *Influence of Sea Power upon History, 1660-1783*, and his *Life of Nelson*. As a historian he has made a distinct contribution to the science by pointing out how maritime strength is one of the determining factors in the development and prosperity of a nation.

Mahanadi, *mah hah nah'de*, or **Mahanuddy**, a river in southern Hindustan, which flows through the Central Provinces and Orissa, falling by several mouths into the Bay of Bengal. Its total length is 520 miles, and it has several large tributaries. Together with the canal system which has been constructed in connection with it, it irrigates hundreds of thousands of acres.

Mahanoy, *mah ha noi'*, City, PA., a borough in Schuylkill co., 55 mi. n. e. of Harrisburg, on the Mahanoy Creek and on the Philadelphia & Reading and the Lehigh Valley railroads. It is in the anthracite coal region, near deposits of fire clay and building stone, and it contains foundries, potteries, and flour, lumber and hosiery mills. The borough has a public library, a number of churches and both public and parish schools. It was settled in 1859 and was incorporated in 1863. Population in 1910, 15,936.

Mahdi, *mah'de*, (director or leader), a name assumed by some of the successors of Mohammed, particularly applied to the twelfth imam, the lineal descendant of Mohammed, born 868 A. D. He mysteriously disappeared, being murdered, probably, by a rival, and the belief was that he would remain hidden until the "last days," when he would reappear and at the head of the faithful spread Mohammedanism over the world. Many professed Mahdis have appeared from time to time in Africa as well as Asia, the latest being Mohammed Ahmed, the leader of the Sudanese insurrection (1883-1885). He made the chief city of Kordofan his capital and annihilated the Egyptian army, Nov. 5, 1883. His influence extended to the Red Sea. The Mahdi died in 1885. See GORDON, CHARLES GEORGE.

Mahmud II, *mah mood'*, (1785-1839), sultan of Turkey, placed on the throne after the deposition of his brother in 1808. The chief events of his reign were the war with Russia from 1808 to 1812, which cost him Bessarabia and the provinces of Servia, Moldavia and Wallachia; the war of Greek independence, which ended in the separation of Greece from Turkey and included the destruction of the Turkish fleet at Navarino; the extermination of the Janizaries and the reorganization of the army on a European model; the Treaty of Adrianople with the Russians, who were on the point of entering Constantinople in 1829; the revolt of Egypt under Mehemet Ali, and the new Treaty of Unkiar-Skelessi with the Russians in 1833.

Mahog'any, the wood of a lofty and beautiful tree, native to Central America and the West Indies. It grows most abundantly and attains its greatest development between 10° north latitude and the Tropic of Cancer. It reaches maturity in about two hundred years and grows to a height of forty to fifty feet, with a diameter of six to twelve feet. The wood is hard, compact, reddish brown and takes a brilliant polish.

It is one of the best and most ornamental woods known and is of universal use in the making of fine furniture. It is imported to the United States chiefly from Mexico and British Honduras. British Honduras exports an average of 3,000,000 cubic feet per year. That which is imported from the West Indies is called Spanish mahogany and is most valued.

Mahom'et. See MOHAMMED.

Mahrattas, *ma rat'taz*, a people inhabiting the western part of the peninsula of India and numbering from 15,000,000 to 20,000,000. They are of mixed blood, speak the Hindu language and are followers of the Hindu faith. In the latter part of the seventeenth century they rose rapidly and were instrumental in depriving the Mogul Empire of much of its power. In the latter part of the eighteenth century they were overpowered by the Afghans and later became subject to the British government. The present cities under British rulers are Baroda, Gwalior and Indore.

Maid'enhair, the name given to beautiful ferns, of which there are many widely distributed



MAIDENHAIR FERN

species. The common maidenhair of the United States bears a cluster of upright, brown, shiny, wiry stalks, upon the top of which the graceful fronds expand horizontally. In some cultivated species these fronds are exceedingly delicate.

and in all, the rounded, scalloped leaflets are characteristic.

Maid of Orleans. See JOAN OF ARC.

Main, *mine*, a river of Germany, which rises in the Fichtelgebirge, flows in a general westerly direction for 300 miles and joins the Rhine a little above the town of Mainz. For about 200 miles from its mouth it is navigable. By means of the Ludwig Canal it affords through navigation to the Danube.

Maine, called the PINE TREE STATE because of the vast extent of pine forests which once existed within its limits, is one of the New England group of North Atlantic States. It is the most northeasterly state of the Union, lying between latitude 43° 4' and 47° 28' n. and between longitude 66° 57' and 71° 7' w. It is bounded on the n. w. by Quebec, on the n. e. by New Brunswick, on the s. e. by the Atlantic Ocean, and on the w. by New Hampshire. The extreme length of the state is 303 miles, and the extreme width is 212 miles. The total area is 33,040 square miles, of which a little more than 3000 square miles are water surface. The coast in a direct line from Eastport to a point opposite Portsmouth is 218 miles, but because of the numerous indentations Maine has really about 4300 miles of seacoast. There are proportionally more good harbors on the coast of Maine than on any other part of the Atlantic coast. Population in 1910, 742,371.

SURFACE AND DRAINAGE. The surface is moderately hilly. A height of land, lying on the west near the source of the Magalloway River, extends across the state in a northeasterly direction, reaching the eastern border at Mars Hill. At its western extremity this elevation is 2000 feet high, but its altitude gradually lessens until at the eastern boundary it is only 600 feet high. To the north of this divide the country is drained almost wholly into the Saint John. The state contains a number of mountain peaks, which, though apparently detached, belong to the Appalachian system. The most noted of these is Mount Katahdin (which see) in the central part of the state. This is one of the most celebrated mountains in New England. Others worthy of mention are Mount Abraham, 3387 feet; Mount Bigelow, 3600 feet; Saddleback, 4000 feet; Mount Blue, 3900 feet; Bald Mountain, Mount Kineo and Mount Haystack are also well known. That portion of the state south of the divide is hilly and broken. The numerous islands off the coast and the irregular coastline with its numerous good harbors are

due to the extension of the surface under the level of the sea.

The Saint John River and its tributaries drain nearly all the state north of the divide; the southern portion is drained by the Penobscot, Kennebec, Androscoggin and Saint Croix rivers, all of which are rapid streams and furnish extensive water power.

There are over 1500 lakes in the state, many of which are famed for their beauty and their excellent fish. The most noted of these is Moosehead Lake in the west central part of the state. It has an area of over 500 square miles.

CLIMATE. The climate of Maine is cold for a large part of the year; snow covers the ground from three to five months. The summers are short and hot, and even in the southern portion the farmer has not more than five months in which to mature his crops. The prevalence of forests, the fine river drainage, and the sea breezes have all tended to make the climate of Maine both healthful and delightful.

The combination of mountain, hill, stream and forest and its pleasant summer climate have made Maine one of the most desirable localities for summer resorts. The lakes and streams of the interior abound in game and fish, and the great forests in the northern part of the state are the home of the moose, the bear and other large game. During the open season this region is frequented by hunters, many of whom come from a distance.

MINERALS. Granite is found in large quantities in the southern part of the state, and the quarrying and shipping of this stone form the chief mineral industry. Hallowell and Dix Island furnish the greatest amount of granite. The capitol at Albany, and the Metropolitan Museum of Art, New York City, are built of Hallowell granite. Large quantities of lime are made from the extensive limestone deposits of Knox county. A good quality of slate is found in the central part of the state. It is quarried for table tops, blackboards, roofing, and finishing interiors. The slate from Piscataquis county is remarkably pure, is of a deep black color and can be split into thin plates. In some localities there are deposits of feldspar and silica of excellent quality. Some of the products made wholly or in part of this feldspar and silica are glass, porcelain, sandpaper, scouring soap and earthenware. There is a famous tourmaline deposit in Oxford county from which the largest and most beautiful

crystals known have been taken. There are in the state about thirty mineral springs of commercial importance. Water from the famous Poland Spring is shipped even to foreign countries.

FORESTS. Maine is one of the leading states in the Union in the extent of its forest area and the annual value received from the forest products. In 1900 the woodland covered more than three-fourths of the total area. The primeval forests of pine are all gone, and a good-sized second growth is now furnishing material for the lumber mills. The spruce forests are the most extensive and the most heavily drawn upon at the present time. A belt of white birch, extending across the state, furnishes wood for spools. This spool timber is shipped extensively to Scotland. In 1900 almost one-half the spool stock of Great Britain came from Maine. Large quantities of cedar are found in the St. John and Penobscot basins. Because of the rapid destruction of forests, both the state and private corporations are taking active measures for the preservation of the timber, and the reforestation of denuded areas.

FISHERIES. The fisheries rank second in importance among those of the New England states. In the coast waters are large quantities of lobsters, clams and mussels; in the bays and fiords are rock-cod, sculpin, bluefish, cunners and flounders; while in the off-shore waters are cod, herring, halibut, haddock, mackerel, hake, porgy, menhaden and pollock. One of the smaller species of herring furnishes a large amount of the fish used in the sardine canning industry of Lubec and Eastport. The rivers and lakes are so well stocked with the choicest fish that Maine is considered the sportsman's paradise. The salmon fishing is largely in the Penobscot and Kennebec.

AGRICULTURE. The soil in the greater part of the state is not very well adapted to agriculture. Along the river valleys, however, and in Aroostook county, are many excellent farms. The chief crops are potatoes, hay, oats and wheat. Apples are successfully raised in a number of counties. The finest sweet corn in the world is raised in large quantities for canning, and is shipped to all parts of the world. The dairy products are second in value only to those of Vermont among the New England states.

MANUFACTURES. The rivers flow swiftly over rocky beds, and the consequent extensive water power has made Maine an important manufacturing state. Shipbuilding was one

of the first manufacturing industries. Bath was the chief shipbuilding center of the United States for a hundred years, and is still engaged in this industry, though now the building is chiefly of steel vessels. Lewiston, Biddeford and Saco are very extensively engaged in the manufacture of cotton goods. Immense quantities of paper and wood pulp are manufactured in Maine. Large quantities of lime are made in Knox county. Other important manufactures are woollens, leather, lumber products and foundry products.

TRANSPORTATION. The coast of Maine abounds in good harbors, and the Penobscot and Kennebec are each navigable for about sixty miles. Thus Maine has always had convenient water transportation. Portland is connected by fine steamers with Boston, New York, and the Provinces, and is the port for several trans-Atlantic lines. Railway lines cross the state from east to west and from north to south. Two of these, the Grand Trunk and the Canadian Pacific, are important trunk lines, connecting with other great systems of the United States and Canada, thus giving direct communication with the central and extreme western portions of the country. Another important system, the Boston & Maine, makes similar connections through Boston and New York with the Southern states, while the Maine Central connects various places within the state. The state has more than 2000 miles of railway lines, besides numerous electric lines which are being extended every year. Portland is the chief railway center.

GOVERNMENT. The legislature consists of a senate of 31 members and a house of representatives of 151 members elected biennially by popular vote. The senators are chosen from the counties, which are the senatorial districts. The representatives are elected from towns. The governor is chosen by popular vote for a term of two years. His council, consisting of seven members, also the secretary of state, the state treasurer, and the attorney-general, are elected by joint ballot of the legislature. As in the other New England states, the local government is largely in the hands of town officers. The Supreme Court comprises eight judges appointed by the governor and council for a term of seven years. The judges of the two special courts in Kennebec and Cumberland counties, known as superior courts, and the judges of the inferior courts, except the probate courts, are also appointed by the governor and

Maine

council. The probate judges are chosen at popular election for a term of four years.

EDUCATION. The town system of common schools is in use, the town being the smallest unit for their administration. In general the schools are well organized and well taught. A state superintendent of schools is appointed by the governor and council for a term of three years. The state has a considerable school fund, which is supplemented by a state tax of three mills on each dollar of the valuation, and by a local tax under the state law that every town shall raise annually not less than eighty cents per capita of all inhabitants. A compulsory school law which covers the ages of seven to fifteen is well enforced. All cities and the larger towns maintain graded schools and high schools. There are state normal schools established at Castine, Farmington, Gorham and Presque Isle; and by vote of the legislature in 1909 there is to be one established at Machias. Other prominent educational institutions are Bowdoin College at Brunswick, the University of Maine at Orono, Colby College at Waterville, Bates College at Lewiston, and the Maine Wesleyan Seminary and Woman's College at Kent's Hill.

INSTITUTIONS. The school for the deaf is in Portland, as is also the Maine General Hospital and a United States marine hospital. There is a United States soldiers' home at Togus. The hospitals for the insane are at Augustus and Bangor; there is an orphans' asylum at Bangor, and a military and naval orphans' asylum at Bath. The state prison is at Thomaston, the state school for boys at South Portland, and the state industrial school for girls at Hallowell.

CITIES. The chief cities are Augusta, the capital, Portland, Lewiston, Bangor, Biddeford, Auburn, Bath, Waterville, Rockland, Calais and Westbrook, each of which is described under its title. Bar Harbor, Mount Desert Island and Old Orchard Beach are famous as watering places.

HISTORY. Maine was visited by the earliest explorers, probably by the Norsemen about 1000 A. D., by Verrazano in 1524, by Sir John Hawkins in 1565, by Gilbert in 1583, by Gosnold in 1602, and by John Smith in 1614. The first English settlement was established at the mouth of the Kennebec River in 1607, under the auspices of the Plymouth Colony, and was directed by George Popham, but owing to the rigorous climate the settlement was abandoned in the following spring. In April, 1622, Sir Fernando Gorges and George Mason received the grant of land between the Merrimac and the Kennebec.

Maintenon

In 1629 this was divided and Gorges received the strip between the Piscataqua and the Kennebec. A settlement was made at York, which was the first chartered city in America. Later settlements were made at Saco, Biddeford and Scarborough, but all were destroyed by Indian uprisings, and in 1677 Massachusetts purchased the whole territory, which was united with it by charter in 1692. It did not again have a separate existence until it was admitted to the Union as a state in 1820, to offset the admission of Missouri as a slave state. (See *MISSOURI COMPROMISE*.) From that time until the Civil War the only important public questions in the state were the dispute over the northeast boundary, which was finally settled by the Webster-Ashburton Treaty of 1842; and the enactment in 1851 of a law prohibiting the manufacture and sale of intoxicating liquors. This law, in 1884, became an amendment to the constitution. In the Civil War the state furnished more than 70,000 men to the Union army. Maine has never had any serious internal trouble. The Australian ballot law was passed in 1891.

Maine, UNIVERSITY OF, a state university, established at Orono in 1867, under the name of the State College of Agriculture and Mechanic Arts. This was changed to the present name in 1897. The present organization includes a school of arts and sciences, which offers classical, Latin, scientific and general scientific courses; a school of engineering, a school of agriculture, a school of pharmacy and a school of law. The university is co-educational. Its faculty numbers about 100, and there are about 900 students enrolled. The income, including state and government appropriations, is about \$200,000. The number of volumes in the library is 45,000.

Maintenon, *maN t' nohN'*, FRANÇOISE D'AUBIGNÉ, Marquise de (1635-1719), second wife of Louis XIV. Left quite destitute in her tenth year, Mademoiselle D'Aubigné spent her youth in dependence on her rich relatives, and was glad to contract a marriage with the famous wit Scarron, a deformed, old and infirm man. Her beauty and intelligence gained for her powerful friends among those who frequented her husband's house; and on Scarron's death she was intrusted with the charge of the children born to Louis XIV by Madame de Montespan. She assumed this office and soon so captivated the king that he married her privately in 1684. For the remaining years of his life she was his most confidential adviser.

Mainz

Mainz, *mine is*, a fortified town of Germany, in the grand duchy of Hesse, finely situated on the left bank of the Rhine, opposite the mouth of the Main, 20 mi. w. s. w. of Frankfort. The older part of the town was modernized after the destruction caused by a powder-magazine explosion in 1857, and an extensive new quarter has been added since the recent widening of the fortified circuit. The city contains a fine statue of Gutenberg, by Thorwaldsen. The manufactures embrace leather, furniture, hardware, carriages, tobacco, beer, chemicals, musical instruments and cars. The trade, particularly transit, is extensive. Mainz was for long the first ecclesiastical city of the German Empire, of which its archbishop-electoral ranked as the premier prince. Its history during the sixteenth century is of considerable interest in connection with the progress of the Reformation. Population in 1910, 110,634.

Mait'land, WILLIAM (1528?-1573), a Scotch statesman, commonly known as Secretary Lethington, because he was the son of Sir Richard Maitland of Lethington. In 1560 he was a speaker in the Parliament which abolished the authority of the pope in Scotland. When Mary Stuart arrived in Scotland from France, he was chosen one of her principal ministers, and was continually employed as her agent at the English court. He took part in the plot against Rizzio and knew of Bothwell's plot against Darnley, for supposed complicity in which he was later arrested. He kept up an active correspondence with Mary, and after the death of Murray he became the leader of the queen's party. He was therefore proclaimed a traitor by Parliament and thrown into prison, where he died.

Maize, one name of the common corn, or indian corn. See CORN, INDIAN.

Maj'esty, a title bestowed upon kings and queens. The former kings of France were addressed as "most Christian majesty," the former kings of Portugal, as "most faithful majesty;" the kings of Hungary are called "apostolic majesty;" the kings of Spain, "most Catholic majesty." The emperor of Germany has the title of "imperial royal majesty."

Majolica or **Maiolica**, a beautiful enamel earthenware, decorated in colors and made in Italy. There the term is applied to all such wares, but by artists it is restricted to such as are decorated with a fine metallic luster or to the richly decorated wares of the fifteenth and sixteenth centuries. The most famous and beautiful majolica was made in the towns of

Malaga

northeastern Italy, where plates, platters, bowls, vases, pitchers and unique forms of bottles or flasks constituted the most commonly decorated objects, though the ware was sometimes used in tiling for floors and walls. See POTTERY.

Ma'jor. See MUSIC; SCALE.

Major'ca (Spanish *Mallorca*), an island in the Mediterranean, belonging to Spain, the largest island of the Balearic group, about 58 mi. in length and about 1330 sq. mi. in area. It is very irregular in shape and deeply indented. The west and north coasts, which look towards Spain, are steep and lofty, but in other directions, and particularly on the east, the coasts are low and shelving. The island is generally fertile, producing, besides large crops of cereals, hemp, flax and fruits. Silk is also raised. The pastures are rich and maintain large numbers of cattle, and the fisheries on the coast are valuable. Several railways traverse the island. The chief town is Palma. Population in 1910, 260,000.

Makaw', a small tribe of indians who live near the entrance to Puget Sound. They are skilful and daring fishermen and boatmen and in former times were warlike in nature. The women weave beautiful baskets. Unlike other indians, the men have beards. The Makaws live upon a small reservation and are fairly civilized.

Malac'ca, a town forming part of the British colony of the Straits Settlements, on the west coast of the Malay Peninsula. It is one of the oldest European settlements in the East, having been founded by the Portuguese in the early part of the sixteenth century. The Dutch gained possession of it in 1641 and the English in 1824. Population, about 20,000.

Malacca, STRAIT OF, the channel between the Malay Peninsula and the island of Sumatra. In length it is a little over 500 miles, and in width it varies from about 30 miles to 190 miles.

Malachite, *mal' a kite*, a carbonate of copper, of a dark, emerald-green color. The finest specimens are obtained from Siberia and Arizona, but it is found in many places all over the world. Fibrous malachite, when finely pulverized, is used as a paint; massive malachite is made into boxes, knife-handles, table-slabs and other ornamental articles and is susceptible of a beautiful polish.

Mal'aga, a seaport of southern Spain, the capital of a province of the same name in Andalusia, on the Mediterranean. There are some interesting ancient buildings and a number of imposing modern structures. The manufac-

Malaria

tures consist chiefly of iron, the ore of which is obtained from mines in the vicinity; soap, cottons, leather and paper. The trade is of much importance, the principal exports being olives, wine, figs, almonds, raisins and lead in bars. The climate is perhaps the mildest and most equable in Europe. Malaga was a flourishing city under the Romans, and its long occupation by the Moors left distinct marks in the older parts of the town. Population in 1910, 136,365.

Malaria, a name sometimes given to air tainted by poisonous emanations from animal or vegetable matter, especially the exhalations of marshy districts, which were supposed to produce fevers. A class of diseases, among which intermittent and remittent fevers occupy a prominent place, have been known from a very early period to be especially prevalent in marshy districts, where they are promoted at particular seasons by certain conditions of heat and moisture. The emanations from decaying animal or vegetable matter were formerly supposed to be the direct cause of the disease, but recent investigations have shown that the immediate cause of such diseases is the presence of bacteria in the blood, and that these bacteria are carried from the decaying substances, in which they were bred, to the human body by the aid of the mosquito (See GERM THEORY OF DISEASE). At one time the Campagna, or great plain surrounding the city of Rome, was fertile and thickly populated, but for centuries it has been almost deserted because of the malarial diseases prevalent there. Large tracts on the western coast of Africa and in parts of India are dangerous to whites for the same reason. By attention to drainage and the destruction of the breeding places of mosquitoes, many of these localities may be made safe places of abode.

The word *malaria* is now applied to a disease which manifests itself as a chill followed by fever, perspiration and general weakness and prostration. Common names for this disease are *ague* and *chills and fever*. The attacks recur with perfect regularity, at periods of from one to four days, according to the life period of the bacillus which causes the attack. See MOSQUITO.

Malay' Archipelago, also known as the Indian or Eastern Archipelago, the great group of islands situated to the southeast of Asia and washed on the west by the Indian Ocean and on the east by the Pacific Ocean. The archipelago lies, approximately, between the parallels of 11° south latitude and 17° north latitude. Within

Malden

these limits lie some of the largest and finest islands in the world, as Borneo, Sumatra, Java, Celebes and the Philippines; New Guinea is not ranked as belonging to the group. The chief of the smaller islands are the Moluccas, or Spice Islands, Billiton, Banca, Madura, Bali, Lombok, Sumbawa, Flores and Timor. The islands are generally fertile and are covered with a luxuriant vegetation; they produce all kinds of tropical products in abundance. Many of them contain volcanoes. The chief native race is the Malayan. A large portion of the archipelago is really, or nominally, under the sway of Holland, and this portion is frequently called the Dutch East Indies.

Malay Peninsula or **Malacca**, the most southern part of continental Asia, the long narrow projection that stretches first south, then southeast, from Siam and Burma. It is connected with Lower Siam by the Isthmus of Kra, has on the east the Gulf of Siam and the China Sea and on the west the Strait of Malacca. It varies in width from about 50 miles, at the Isthmus of Kra, to about 210 miles, and the area is about 90,000 square miles. The country is mountainous, with peaks from 7000 to 8000 feet high, is densely wooded and has numerous short rivers. Of the minerals, the most important is tin, which is found in great quantities and is largely exported. Politically the peninsula belongs partly to Great Britain and partly to Siam. There are a number of small states, governed by native chiefs, which are protectorates of Great Britain. The native races are Siamese, Malays and Negritos. The population is variously estimated at from 1,000,000 to 2,000,000.

Malay Race or **Brown Race**. See RACES OF MEN.

Malden, *maw' den*, MASS., a city in Middlesex co., 5 mi. n. of Boston, on the Malden River and on the Boston & Maine railroad. It is an important manufacturing center, with more than six hundred establishments and almost fifty different industries. The chief products are rubber, boots and shoes, shoe lasts, boot trees, leather, paper, fiber and knit goods, furniture and other articles. The city has excellent schools, a Y. M. C. A. and many fine church buildings, four libraries, a home for the aged and a city hospital. The place was settled in 1641 and remained a part of Charleston until 1649. It was chartered as a city in 1881. Population in 1910, including several villages, 44,404.

Mal'dive Islands, a chain of islands in the Indian Ocean, extending from latitude 0° 45' south to 7° 6' north, nearly on the meridian of 73° 30' east. The chain is composed of seventeen clusters of atolls. The larger islands are covered with trees, chiefly palm, and produce fruits, various kinds of edible roots and millet. All kinds of fish are found about the islands, and the inhabitants carry on a considerable trade with Bengal, Ceylon and the Malabar coast. A sultan rules over the islands, which are inhabited chiefly by Singhalese, who are Mohammedan in faith. Population, about 30,000.

Malibran, *ma le brahN'*, MARIA FELICITA (1808-1836), a contralto vocalist, one of the greatest singers of modern times. She was the daughter of a well-known singer and singing master, Manuel Garcia, and made her début in 1825 in London. The following year she went to New York, where she married M. Malibran, a French banker, from whom she soon separated. She returned to Europe, where her splendid vocal powers and dramatic ability made her a favorite. Having obtained a divorce from her first husband, she married the violinist De Bériot.

Malice, *mal' is*, in law, a formed design or intention of doing mischief to another, called also *malice prepense* or *malice aforethought*. *Malicious mischief* is the committing of an injury to public or private property from sheer wantonness. This offense is punishable with great severity. The law presumes malice in the very commission of the act; so it lies with the party indicted to rebut the presumption of malice or sufficiently to explain the act. See MURDER.

Malines, *ma leen'*. See MECHLIN.

Mal'leability, a property of matter by virtue of which it can be hammered or rolled into sheets. Malleability is confined almost entirely to metals, and there are but few metals that are not malleable. Those possessing this property in the highest degree are, in the order named, gold, silver, copper, platinum, iron, aluminum, tin, zinc and lead. See GOLD BEATING.

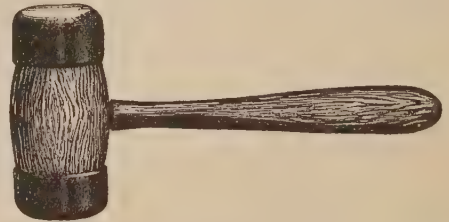
Mal'let, a small wooden hammer, or beetle, used by carpenters and others, for driving another tool, as a chisel. It has a small handle and is used with one hand. The name is also given to the long-handled tool used to drive croquet balls. Other small mallets are used by jewelers and dentists.

Mal'lock, WILLIAM HURRELL (1849-), an English author. He was educated at Balliol

College, Oxford, where he gained the Newdigate prize for a poem on *The Isthmus of Suez*. His writings, whether political, philosophical or fictional, deal mostly with current questions. Among his publications are *The New Republic*, *The New Paul and Virginia*, *Is Life Worth Living?*, *A Romance of the Nineteenth Century*, *The Old Order Changes*, *A Human Document* and *The Heart of Life*.

Mal'lory, STEPHEN RUSSELL (1813-1873), an American politician, born at Trinidad, West Indies. He was appointed inspector of customs at Key West in 1832, seven years later was admitted to the bar, served in the Seminole Wars and from 1851 to 1861 was United States senator from Florida. He retired in the latter year to enlist in the Confederate service, but was appointed secretary of the navy of the Confederacy, where he served until the close of the war. He was captured in 1865, but was released in the following year and returned to the practice of law.

Mallory, STEPHEN RUSSELL (1848-1907), an American lawyer and politician, born in Florida, the son of Stephen R. Mallory, former United States senator from Florida. He entered the Confederate army in the fall of 1864 and in the



MALLET

following spring entered the navy, where he served until the close of the war. He graduated at Georgetown College in 1869, was admitted to the bar in 1873 and in the following year began practice at Pensacola, Fla. He was elected to the state legislature in 1876 and in 1891 was chosen to Congress as a Democrat. He was elected to the United States Senate in 1897 and was reelected in 1903.

Mal'low, the common name of a genus of plants and of a much larger family. The common mallow is a widely diffused species, with reddish-purple flowers, that on drying become blue and yield their coloring principle both to water and alcohol. The dwarf mallow is also a native of Britain. Its stems, which are short, simple and spreading, rise from a long, deeply buried root. Its leaves are of a handsome,

round, heart-shaped form, somewhat lobed and scalloped on their edges; the flowers are white, violet-white or purplish, and the fruits are flat and circular. The musk mallow has handsome, deeply cut leaves, which diffuse a pleasant, musky odor. Both species have become naturalized in the United States.

Malmö, *mahl' mö*, a seaport of Sweden, capital of the prefecture of Malmöhus, situated on the Sound, opposite Copenhagen. It is the terminus of eight railway lines, has steamship connection with many European cities and is connected by ferry with Copenhagen. The chief buildings are the city hall, which dates from the sixteenth century, the governor's residence and several churches. The manufactures are considerable and consist chiefly in iron, cottons, tobacco, gloves, brandy, chocolate and cars. Population in 1911, 89,719.

Malone, N. Y., the county-seat of Franklin co., 60 mi. e. of Ogdensburg and 12 mi. from the Canadian line, on the Salmon River and on the New York Central and other railroads. The village is on the northern foothills of the Adirondacks, in an agricultural region producing hops, hay, potatoes, poultry and dairy products. The industries include tanneries, woolen, paper and flour mills, foundries, machine shops and woodworking establishments. It is the seat of the Northern New York Institution for Deaf Mutes and of Franklin Academy. The first settlement was made in 1802. Population in 1910, 6467.

Mal'ory or **Mallore**, THOMAS, Sir, an English author, about whom little is known, save that he flourished in the latter half of the fifteenth century. He is famous as the author of the *Morte d'Arthur*, which contains the stories of Arthur and the Round Table which Tennyson afterward utilized in the *Idylls of the King*. These tales were probably translated into English from old French romances, and they form the first important English romance in prose.

Malpighi, *mal pee' ge*, MARCELO (1628-1694), an Italian physician celebrated for his anatomical discoveries made in the dissection of animals. Among the facts he learned are the spiral structure of the heart muscles and the structure of glands. Besides his achievements in anatomy, his industry and great originality enabled him to make almost equally important discoveries in botany and entomology.

Malt, *mawlt*, grain, usually barley, steeped in water and made to germinate. The starch of the grain is thus converted into sugar, after

which it is dried in a kiln and then used in the brewing of porter, ale or beer, and in whiskey distilling. One hundred parts of barley yield about ninety-two parts of air-dried malt. See BREWING.

Malta, *marl' tah*, an island in the Mediterranean, belonging to Great Britain, 58 mi. s. s. w. of Sicily and 180 mi. from Africa. Its area is about 95 square miles, to which the adjoining islands of Gozo and Comino, Cominotto and Tilfla add 22. The most important indentation is the double bay on which the capital, Valetta, an important naval station, stands. The greatest elevation of the island is about 845 feet. There are only a few small streams, but the springs are so numerous and copious that no deficiency of water is felt. Corn, cotton, potatoes and clover are the chief crops. Both the vine and the olive are cultivated, and fruits, particularly figs and oranges, are very abundant. The manufactures consist of cotton goods, lace, jewelry and lucifer matches. The climate is very hot in summer, but pleasant and healthful in winter, attracting many visitors at this season. Malta was held by the Knights of the Order of Saint John of Jerusalem from 1530 until 1798, when it was surrendered to Napoleon Bonaparte. It was taken from the French by the British in 1800, and it was finally annexed by them in 1814. The people are mainly of Arabic race, and speak a kind of Arabic mixed with Italian. Italian and English are also spoken. The educational institutions include a university, a lyceum, two secondary schools and many primary schools. Besides the capital, Valetta, and the three cities adjoining, there are several considerable towns or villages. Population in 1911, including a garrison of about 8000 British troops, 228,534.

Malta, KNIGHTS OF. See JOHN, KNIGHTS OF SAINT.

Mal'thus, THOMAS ROBERT (1766-1834), an English political economist. In 1805 he was appointed professor of history and political economy in the East India Company's College at Haileybury, an office which he held till his death. He first published the views with which his name is associated in his *Essay on the Principle of Population as it Affects the Future Improvement of Society*. His leading principle is that population, when unchecked, goes on increasing in a higher ratio than the means of subsistence can, under the most favorable circumstances, be made to increase; that the great natural checks to excessive increase of popula-

tion are vice, misery and moral restraint, and the great business of the enlightened legislator is to diminish the first two and give every encouragement to the last.

Mal'vern Hill, BATTLE OF, an important battle of the Civil War, fought near the James River, at Malvern Hill, Va., July 1, 1862, between the Federal Army of the Potomac of about 80,000 men, under General McClellan, and the Confederate Army of Northern Virginia, about equal in numbers, under General Lee. It was the last of the "Seven Days' Battles" and practically terminated the Peninsula Campaign. The Federals held the hill, naturally a strong position, and the Confederates were compelled to begin the assault. Though conducted with the greatest bravery and skill, the attack failed, and Lee's force was compelled to withdraw with a loss of fully five thousand. The loss of the Federals was about one-third of that number.

Mamar'oneck, N. Y., a town of Westchester co., situated on Long Island Sound and on the New York, New Haven & Hartford railroad, 20 mi. from New York City. It is a beautiful residence place and has many handsome dwellings belonging to New York business men. Population in 1910, 5699.

Mam'eiuks the former mounted soldiery of Egypt, consisting originally of Circassian slaves. As early as 1254 they became so powerful that they made one of their own number sultan, and this dynasty continued till the sixteenth century, when it was overthrown by Selim I. They suffered severely in opposing the French at the end of the eighteenth century, and in 1811 Mehemet Ali caused a general massacre of them throughout Egypt.

Mam'ertine Prison, THE, one of the oldest of the remains which exist of ancient Rome. It is supposed to have been begun in the time of Ancus Martius, but additions were made to it as late as the time of Tiberius. Many of the most famous events of Roman history were intimately connected with the Mamertine Prison. It was here that Jugurtha was allowed to starve and that several of the Catiline conspirators were put to death.

Mamma'lia, the highest class of the vertebrates and of the animal kingdom, including all those warm-blooded animals that suckle their young. The latter is the one distinctive characteristic, and in all excepting the lowest orders the young are brought into the world alive and feed themselves upon the mother's milk; but in some of the lower orders the young are not fully

developed when born and are carried and fed by the mother. The higher we ascend the scale of life, the longer is the period through which the young are more or less dependent upon their parents.

The skin of mammals is always covered more or less with hairs, which are found in many forms, from the finest wool to large, coarse bristles and even spines. The skeleton is quite uniform in essentials, and in most points it agrees with that of man. The skull forms a single piece, composed of bones fixed together, to which is articulated a lower jaw. The skull rests upon the vertebral column, to which limbs, never more than four in number, are attached. The fore limbs are invariably present, but the cetaceans and some other mammals have no hind limbs, or they appear only in rudimentary form. Most mammals have teeth, but they appear only in embryo in the whales and are entirely absent in the ant-eater and some other forms. The muscles of mammals are well-developed and perfect, resembling the birds in this respect. The diaphragm, which divides the body cavity in two, is peculiar to mammals. Air is breathed directly into the lungs, even by the whales and other water-living animals. All have warm red blood, which is driven by a four-chambered heart to all parts of the body through distinct vessels called arteries, and which returns through another set of tubes to the lungs for purification. The anatomy of all mammals is so similar to that of man that the student is referred for greater detail to the separate articles in this work descriptive of the organs of man.

No mammals existed in New Zealand nor the Polynesian Islands until they were introduced by man. The marsupials, or animals which carry their young for a time in pouches, are confined to the Australian region and the one genus opossum in America. Otherwise mammals are distributed widely in all parts of the world. Mammals are so well adapted for life under varying conditions that they have been carried from their native haunts, and concerning the original home of many we now have no information. The apes, monkeys and those mammals which are most closely related to man in structure inhabit the tropical or sub-tropical regions. The character of mammals seems to be largely dependent upon their food and surroundings. Those which live upon other animals are fierce and active and highly intelligent, living comparatively solitary lives.

Mammoth

On the other hand, the vegetable-eating mammals are comparatively timid and often herd together; though many bear weapons of defense, most of them trust to their fleetness or to their ability to conceal themselves in order to escape from their enemies. Of course many mammals combine vegetable and animal food in varied proportions. Mammals have been variously classified, but the authority of Cuvier is generally recognized in the main, though recently a more perfect arrangement of some divisions has been made. Two primary classes are recognized, the smaller of which is composed of those animals provided with a temporary pouch in which the young are hatched; they are known as the Monotremata (See DUCK-BILLED PLATYPUS). The second subclass includes all the remaining families, namely, Marsupialia, Edentata, Ungulata, Sirenia, Cetacea, Carnivora, Rodentia, Insectivora, Chiroptera and Primates. By reading the articles on these families, and the cross references therein, a very satisfactory idea of the Mammalia and its principal members may be obtained.

Mam'moth, a species of extinct elephant, the fossil remains of which are found in Europe,



MAMMOTH

Asia and North America. Geologically speaking, the mammoth dates from before the Glacial period, which it survived, and lived into the earlier portion of the human period. Its bones and large curved tusks have been found in great abundance in Siberia. An entire carcass, which had been preserved in the ice, was discovered toward the close of the eighteenth century on the banks of the river Lena, in such a perfect state that the flesh was eaten by animals. The skin was perfectly preserved and was clothed with a furry wool of reddish color, interspersed with black hairs. The skeleton and other parts of this animal are preserved in the St. Petersburg Royal Museum. It must have

Man

been twice as bulky as the elephants living at the present time.

Mammoth Cave, the largest known cave in the world, situated in Kentucky, near Green River, about 80 mi. s. w. of Louisville. It is one of a series of large caverns, formed in limestone rock which extends over an area of about eight thousand square miles, including portions of Kentucky, Tennessee and Indiana. The cave is about ten miles in diameter, and passageways aggregating more than one hundred miles in extent have been explored. The main cave is three miles long and from 40 to 175 feet in width, and in some places it is 125 feet high. The largest room, known as the Chief City, is oval in form, 541 feet long, 287 feet wide and 125 feet high. There are numerous other very interesting rooms, among which is the Star Chamber, a dome with a lofty ceiling of black rock, dotted with snow-white crystals of gypsum, which, when seen by reflected light, glisten like stars. The cave contains a number of rivers and small lakes. The largest, Echo River, is about three-fourths of a mile long and obtains its name from the wonderful echoes produced in the portion of the cave through which it flows.

As far as explored, there are five altitudes, or levels, and from the pit descending to the lowest of these a number of passageways have been discovered. These passageways undoubtedly lead to other chambers of great interest. The rivers contain numerous blind fish, and blind grasshoppers, beetles and other insects are found in the cave. Mammoth Cave was discovered in 1809 and was first brought to general attention through large deposits of saltpeter found there and used for the manufacture of gunpowder during the War of 1812. See CAVE. Consult Hovey's *Celebrated American Caverns*.

Man, the most highly organized being in the animal world. Though many attempts have been made to classify man as entirely separate from the rest of the animal kingdom, yet the more recent studies show him physically to belong to the highest family, in the group of apes and monkeys. But in mental endowments man ranks far above the highest of the apes. Again, he walks erect upon his feet and uses his hands solely for the purpose of taking and holding things; the bones of his face do not project forward, but rather downward, and are immediately below his brain; he has much greater cranial capacity than any other animal, and the convolutions of his brain are far more numerous

and complex; his teeth are arranged close together; his hair covers only restricted areas of the body, and in various other minor ways man shows his difference from the apes. Man possesses a reasoning mind and has a moral sense of right and wrong; he possesses an articulate language, by which he can communicate his thoughts readily—gifts which no other animal ever possessed. The gorilla, orang-outang and chimpanzee most closely resemble man, the latter differing less than any of the others.

Where man originated or how he became distributed over the earth are questions which no one can settle. Darwin believed that he was directly descended from some form of anthropoid ape now extinct and that all present races have come from one parent stock. Wallace believes a portion of this doctrine, but thinks that man has been especially endowed by his Creator with a high, controlling intelligence. Other great scientists believe that the race has been developed from separate beginnings and deny the supernatural creation of mind or soul.

Man, **ISLE OF**, an island in the Irish Sea, almost equidistant from England and Ireland and 15 mi. s. of Scotland. Its area is about 227 square miles. A range of hills extends throughout nearly the entire length of the island, culminating in Snaefell, about 2030 feet above sea level. Lead and zinc are extensively mined, and silver is found in considerable quantity. Fishing is an important industry. The island, which is inhabited chiefly by the Manx, a people of Celtic race, was purchased early in the nineteenth century by the British government. It is ruled by a governor appointed by the English crown, and the legislative authority rests with the House of Keys. The Manx language is still in use, although all the inhabitants also speak English. The principal towns are Douglas, Castletown, Peel and Ramsay. Population in 1911, 52,034.

Managua, *ma nah'gwa*, a town in Central America, capital of the Republic of Nicaragua, on the shore of Lake Managua. It is connected with Granada by rail. Population in 1908, 34,872.

Manar, *ma nahr'*, **GULF OF**, a part of the Indian Ocean, between Ceylon and southern India. It is separated from Palk Strait by a reef, called Adam's Bridge, which runs between the islands of Manar and Ramisseram. The gulf is noted for its pearl fisheries.

Manasarowar, *ma nah' sah ro wahr'*, a lake of Tibet, north of the main chain of the Himalaya

Mountains, between the sources of the Indus and the Brahmaputra. It is almost circular in form, is about 15 miles in diameter and is drained by the Sutlej.

Manatee' or Sea Cow, an animal which resembles the dugong, found on the coasts of South America, Africa and Australia. It generally frequents the mouths of rivers and feeds on algae and such land vegetation as it can reach at high tide. The animal is assisted in feeding by its peculiar upper lip, which is cleft in two and furnished with strong bristles. The manatee has no hind limbs, and the fore limbs, or swimming paws, are furnished with nails, by means of which the animal drags itself along the shore. Manatees are large, awkward animals, attaining a length of from eight to twenty feet. The skin is of a grayish-black color and is sparsely covered with hairs. The flesh and oil are both valuable.

Man'chester, a city, civic county, municipal and parliamentary borough and inland port of Lancashire, England, on the Irwell River, 32 mi. e. n. e. of Liverpool and 164 mi. n. n. w. of London. A ship canal, connecting it with the Mersey, enables the largest ocean steamers to enter the heart of the city (See **MANCHESTER SHIP CANAL**). On the west side of the Irwell is Salford, connected with Manchester by numerous bridges and considered as virtually a portion of the city. Manchester has many important and striking public buildings and many fine streets. The center of the town is largely occupied by immense piles of warehouses and offices, while factories and other manufacturing works are chiefly in the outskirts. Among the principal public buildings are the townhall, or municipal building, in the Gothic style, one of the finest modern buildings in England; the Assize Courts, also a fine specimen of modern Gothic; the Royal Exchange, and the new buildings of the Victoria University. The most noteworthy ecclesiastical buildings are the cathedral, a fine specimen of Perpendicular Gothic, built in the early fifteenth century, and the Church of the Holy Name. The chief educational institution is Victoria University. Chetham's Hospital was founded under the will of Humphrey Chetham for the education of poor boys. Attached to the institution is a library of 40,000 volumes, the first free library in Europe. Among the public monuments, the most noteworthy is the Albert Memorial, in front of the townhall.

The chief manufacture of Manchester is cot-

Manchester

ton, but woolen and silk fabrics are also produced. Metal manufactures, engineering and the making of all kinds of machinery employ many hands. The history of Manchester is legendary down to the tenth century, when the town was devastated by the Danes. In the twelfth century the woolen manufactures began to develop, and in 1301 the place received municipal liberties and privileges. During the civil war the town suffered much at the hands of both parties. The introduction of machinery in cotton spinning toward the end of the eighteenth century gave power and direction to the trade of modern Manchester, and its progress since has been extraordinarily rapid. A temporary check resulted from the Civil War in America, which led to a cotton famine in 1862, causing the deepest distress in South Lancashire. Manchester now returns six members to Parliament, while Salford has three members. Population of Manchester in 1911, 714,333; of Salford, 231,380.

Manchester, CONN., a town of Hartford co., 8 mi. e. of Hartford, on the New England railroad. The chief manufactures are silk, paper and woolen goods. Electric lamps and electrical power machinery are also made. Population in 1910, 13,641.

Manchester, N. H., one of the county-seats of Hillsboro co., the largest city in the state, 17 mi. s. by e. of Concord, and 56 mi. n. by w. of Boston, Mass., on the Merrimac River at the mouth of the Piscataquog River, and on several lines of the Boston & Maine railroad. The city contains a public library, a training school for teachers, Saint Anselm's College, Saint Augustine and Saint Mary's academies, and a state industrial school, besides several charitable institutions. Other prominent structures are the Federal building, the courthouse, a Roman Catholic cathedral and several business blocks. Among the manufactures, boots and shoes are the most important, though cotton cloth was originally the greatest product. Other manufactures include fire engines and locomotives, hosiery, paper, woolen goods, needles, lumber and furniture. The place was settled by the Scotch-Irish in 1722, and was known under different titles until 1810, when it received its present name. It was chartered as a city in 1846. Population in 1910, 70,063.

Manchester, VA., a city in Chesterfield co., on the James River, opposite Richmond, and on the Southern, the Atlantic Coast Line and the Sea Board Air Line railroads. It has a pleasant

Manchuria

location and is connected with Richmond by several bridges. An agricultural region surrounds the city, and there are extensive coal mines in the vicinity. The industrial establishments include foundries, large flour mills, tanneries, brickyards, cotton and paper mills, railroad shops and other factories. Manchester was annexed to Richmond in 1906.

Manchester Ship Canal, a canal extending from Manchester, England, to the estuary of the Mersey River, at Eastham. It is 35.5 miles long, twice as wide as the Suez Canal and has a depth of 26 feet. It was ready for traffic on Jan. 1, 1894, and was formally opened by Queen Victoria on May 21. The construction of this canal cost \$75,000,000. Through it the largest ocean steamers enter the heart of the city, which has six miles of wharfrage and 100 acres of dock accommodations.

Manchuria, *man choo' re ah*, a Chinese territory, occupying the northeastern corner of the Empire. It is bounded on the n. and e. by the Amur and Usuri rivers, which separate it from Russian territory; on the s. e. and s. by the Gulf of Liao-tung, Korea and the Bay of Korea, and on the w. by Mongolia and the Argun River. The total area is about 360,000 square miles. Most of Manchuria is mountainous, but in the north there is a large stretch of land of steppe character. Although only about one-fifth of the arable land is now under cultivation, large crops of grain, cotton, tobacco, rhubarb, opium and potatoes are produced. The mountains are well covered with forests, the chief of which are pine, oak, elm and walnut. The majority of the population, which is estimated at about 17,000,000, is Chinese.

In the seventeenth century the Manchus invaded China and placed their leader's son upon the throne (See **CHINESE EMPIRE**, subhead *History*). Since that time the Manchu dynasty has continued to reign in China, and the Manchu language has become the court and official language. In 1898, as the price of her intervention in the interests of China after the close of the Chino-Japanese War, Russia obtained a lease of the harbors of Port Arthur and Ta-lien-wan. At the former a naval station was established, and at the latter the town of Dalny was founded as the port of Russia for her Siberian productions. During the Boxer trouble in China, Russian forces occupied Manchuria, and after the close of the struggle they were not withdrawn. The result was the war with Japan in 1904. Port Arthur, Dalny and

Mandalay

Mukden, the chief town of Manchuria, fell into the hands of the Japanese, and by the Treaty of Portsmouth, September 5, 1905, Russia was forced to withdraw her forces from Manchuria. See RUSSO-JAPANESE WAR.

Man'dalay, a city of India, the former capital of Burma, situated on the left bank of the Irawadi, 350 mi. n. of Rangoon, with which it is connected by railway. The town formerly consisted of four quadrangles, one within the other, in the innermost of which is the palace of the former king. This was surrounded by a second, which was fortified and surrounded by a moat and walls and used as a residential section for the government officials, while outside dwelt the general body of the inhabitants. A destructive fire in 1892 made it possible to rebuild quite a large portion of the city, and in doing this under British direction the town was greatly improved. The area covered is about six square miles. The streets are shaded and well lighted. The chief buildings are the former residence of the king, or palace, the government house and the hall of justice. The city also contains a number of temples, pagodas and monasteries, and it is celebrated for its grand bazaar, which is a market containing miscellaneous collections of wares. The most important industry is silk weaving. Population in 1911, 138,299.

Manda'mus. See WRIT.

Man'dan, once a large tribe of indians living in North Dakota. Few now remain after years of great disasters, which were, however, met with remarkable courage. The Mandans were driven about by the Sioux; smallpox depopulated their villages, and the tribe was almost forgotten. Yet a few kept faithfully their customs and habits, and, living clean lives, their numbers have increased somewhat. They stretched buffalo skins over a circular wooden framework and made awkward tub-like boats, which, however, they handled with much skill. They tattooed their breasts, and in some of their ceremonies they inflicted terrible torture upon themselves. In complexion they are very light, and albinos are frequently found among them. They are now on a reservation.

Mandarin, *man da reen'*, the term applied by Europeans to government officials in China. There are nine grades, each distinguished by the size and design of a gold button which the officer is required to wear in his hat. The Chinese equivalent for mandarin is *kwan*.

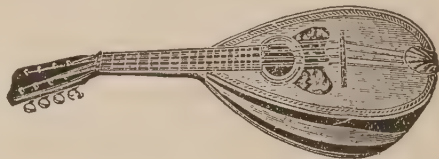
Man'deville, JOHN DE, Sir, the name adopted by the compiler of an extraordinary

Mandrill

book of travels, originally written in French, between 1357 and 1371. An English version was made from the French manuscript in the latter part of the fourteenth century. That part of the book which treats of the Holy Land may be a record of the author's experience, but the greater part is compiled from the accounts of various other travelers.

Mandin'go, a negro tribe of West Africa, remarkable for their intelligence and for the advances they have made in civilization. The original country of this people, who are now spread over a great portion of West Africa, was the north slope of the high tableland of Senegambia. They are nominally Mohammedans, are keen traders, work iron and gold, manufacture cotton cloth and leather and cultivate a variety of crops. They live in small independent states, in large, clay-built, walled towns.

Man'dolin, a musical instrument with a shell-shaped body, composed of strips of differ-



ent kinds of wood glued together, and with a neck like a guitar. There are from four to seven double strings, which are struck by a plectrum in the right hand, the fingers of the left stopping the strings on the fretted finger-board. A long note is produced by rapid striking of a single note many times in succession, producing a peculiar, tremulous tone.

Man'drake, the popular name of several plants, natives of south and east Europe and western Asia, not uncommon in America and Britain. One has large tap-roots, bearing clusters of rootleaves, and short stalks, upon which are the white, bell-shaped flowers. The fruit is a large, two-celled berry, of an orange color, containing many kidney-shaped seeds. The root possesses narcotic qualities, and from its occasional resemblance to the human figure it was formerly supposed by the superstitious to shriek when torn up. In the United States, the May apple, a very different plant, is sometimes called mandrake.

Man'drill, a species of baboon, which is distinguished by the short tail, the elongated, dog-like muzzle, an ugly-looking head, crowned with a crest of black hair, and an orange-yellow beard. The mandrills inhabit western Africa,

Manetho

where they associate in large troops. Full-grown males measure about five feet and are exceedingly strong and fierce. The mandrill has cheek swellings, colored with stripes of brilliant red and blue, and the nose is tipped with bright scarlet. See APE; MONKEY; BABOON.

Man'etho, an ancient Egyptian priest and writer, supposed to have lived about the middle of the third century B. C. Ptolemy II employed him to write a history of Egypt and its gods, selecting him because of his wide acquaintance with Egyptian, as well as with Greek, literature. This history, as well as all other works of Manetho, has perished, but extensive extracts have been preserved by later historians.

Man'ganese, a metal of a dusky white or whitish-gray color, very hard and difficult to fuse. Exposed to air it speedily oxidizes, and it decomposes water with the evolution of hydrogen. The common ore of manganese is the dioxide, black oxide, or peroxide, a substance largely employed in the preparation of chlorine, for the manufacture of bleaching powder or chlorate of lime. Metallic manganese is obtained by reduction of the oxide by means of heat and finely divided carbon. It resembles iron in appearance and properties, is a constituent of many mineral waters and is employed in medicine. In steel manufacture, manganese is used in certain proportions with advantage (See STEEL), and in other manufacturing operations it forms an important element. Manganese ores are found in California, Colorado, Virginia, Michigan and other states of the Union, but not in quantity sufficient to supply the demand. Productive mines are found in Brazil and in Russia.

Mange, *maynj*, a skin disease which afflicts dogs and cattle and, under the name of *scab*, or *scabies*, sheep. It is due to the presence of a small mite, which burrows beneath the skin. The disease appears in the form of pimples, the animal suffers severely and in a short time the skin becomes covered with scabs. The disease is contagious and can be conveyed in numerous ways. The most successful treatment is by dipping the animal in solutions which will destroy the insect. These are usually solutions of tobacco and sulphur, lime and sulphur or carbolic acid. Preparations containing mercury and arsenic or other poisonous materials should not be used. In most regions where the disease is prevalent, farmers combine and construct dips, which are small tanks into which the animals can be plunged.

Manhattan Island

Man'go, the name of a genus of evergreen trees, which are natives of India and the Malay Peninsula, though they have been introduced into numerous tropical countries. In its native state the common mango grows to a height of about forty feet and has a spreading top with dense foliage, the leaves being from six to eight inches long. The flowers are small, reddish-



white or yellow and are borne in dense clusters. The fruit is kidney-shaped and varies considerably in size and color with different species. The best varieties of fruit are highly prized for eating. They are sweet or slightly acid. The unripe fruit is frequently used for sauces and pickles and other preparations. By cultivation the mango has been extended to most of the West India Islands and to Florida and California.

Man'grove, a genus of trees or shrubs which grow in tropical countries along the muddy beaches of low coasts, where they form impenetrable barriers for long distances. They throw out numerous roots from the lower part of the stem and also send down long, slender roots from the branches, like the Indian banian tree. The seeds germinate in the seed vessel, the root growing downward till it fixes itself in the mud. The fruit of some species is said to be sweet and edible, and the fermented juice is made into a kind of light wine.

Manhat'tan Island, N. Y., an island at the mouth of the Hudson River, constituting the Borough of Manhattan, in New York City. It is separated from the mainland on the north and northeast by the Harlem River. The maximum length of the island is 13½ miles, the

width, 2½ miles, and the area, 22 square miles. It has a wharfage front of 22 miles. See NEW YORK (City).

Ma'nia. See INSANITY.

Manil'a, the capital of the Philippine Islands, situated on the western coast of the island of Luzon, at the head of Manila Bay, at the mouth of the river Pasig, which has been deepened so as to admit ocean-going vessels to the harbor. It consists of an old fortified city, with extensive



MANILA AND VICINITY

suburbs, in which live the greater part of the population, and a portion which contains the business premises, factories and warehouses. In San Miguel, which is built on an island formed by the Pasig, are the residences of the wealthy inhabitants. Manila is the center of the commerce of the Philippines, and it exports sugar, tobacco, cigars and cheroots, indigo, Manila hemp, coffee, mats, hides, trepang, rice and mother-of-pearl. It imports cloth and hardware from the United States and Great Britain, and a great variety of articles, such as tea and pottery, from China. The manufactures consist chiefly of cigars and cheroots and hemp and cotton fabrics. Manila was founded by Legazpi, the conqueror of the Philippine Islands, in 1571. It has frequently suffered from earthquakes, one of the most disastrous being that of 1863. The city was surrendered by the Spaniards to the American naval and military forces in the Philippines, Aug. 13, 1898 (See SPANISH-AMERICAN WAR). At that time the Philippine insurgents were surrounding the city, and in the early part of 1899 they broke through the American lines which invested the city and burned a considerable portion of it. In August, 1901, the

military government gave place to the new civil rule. Population in 1910, 234,409.

Manila Bay, BATTLE OF, an important naval battle in the Spanish-American War, fought in the bay at Manila, in the Philippine Islands, May 1, 1898, between an American fleet, under Commodore George Dewey, and a Spanish fleet of about equal strength, under Admiral Montojo, supported by land batteries. The American fleet, which, at the declaration of war, was in Chinese waters, had proceeded to the Philippine Islands and had entered the harbor at Manila during the night of April 30. At about 5:30 the following morning, a vigorous attack was begun against the Spanish vessels, which continued with brief interruption until 12:30 and resulted in the complete destruction of the Spanish ships and the silencing of the batteries. The Spanish loss was more than 600 killed and wounded, while the Americans had none killed and only 6 wounded.

Manistee', MICH., the county-seat of Manistee co., about 140 mi. n. w. of Lansing, on Lake Michigan, on the Manistee River near Lake Manistee, and on the Pere Marquette, the Manistee & Grand Rapids and other railroads. The city has a good harbor and ships considerable lumber, shingles and salt; fruit orchards are now taking the place of what was once a great lumber district. There are foundries, furniture factories, tanneries and other works. The important buildings include a fine courthouse and several good business blocks. Orchard Beach, a popular lake resort, is near here. The place was settled in 1841 and was chartered as a city in 1869. Population in 1910, 12,381.

Man'ito or **Manitou**, among certain of the North American Indians, a name given to whatever is an object of religious awe or reverence. The spirit of good and the spirit of evil are the two principal manitos.

Manito'ba, a Canadian province, bounded on the n. by Keewatin, on the e. by Ontario, on the s. by Minnesota and North Dakota and on the w. by Saskatchewan. For thirty years the province was practically a square with an area of 73,732 square miles but in 1912 the Dominion Parliament increased the area to 251,832 square miles by the addition of a part of Keewatin. It is a trifle smaller than Austria-Hungary.

SURFACE AND DRAINAGE. In the north-eastern corner a section of the Laurentian Hills produces a broken and hilly country, somewhat higher than the surrounding region. The southern and central parts of the province are

nearly level and are a continuation of the broad valley of the Red River of the North, found in Minnesota and North Dakota. The western border of this valley is formed by an escarpment, which marks the shores of the ancient lake of which the valley was the bottom. West of this escarpment the surface consists of rolling or undulating prairie, which increases slightly in elevation toward the western boundary. The higher swells here are known as the Riding and Duck Mountains. In the northwestern corner these mountains are covered with heavy forests of pine.

The Red River of the North crosses the southern boundary a little east of the middle point and continues to Lake Winnipeg. Its chief tributary is the Assiniboine, which enters the province from the west. In the northeastern part are found the Berens and the Pigeon rivers, while the northwestern section is drained by the Swan. All of these streams are small. Three large lakes occupy a portion of the north central part of the province. These are Lake Winnipeg, Lake Winnipegosis and Lake Manitoba. Of these, Lake Winnipeg is the largest, being 270 miles long and varying in width from 20 to 60 miles. All of these lakes are shallow and their shores are low.

CLIMATE. The climate is characterized by extremely cold winters, in which the thermometer may fall as low as 50° below zero, and short, hot summers; but the dryness of the atmosphere prevents these extremes from being felt to the extent that they would be in more humid regions. The rainfall averages about 17 inches, but three-fourths of this occurs during the growing season, so that, notwithstanding the limited annual precipitation, the country is well suited to agriculture.

MINERAL RESOURCES. Manitoba's most valuable mineral resource consists in her large areas of deep, rich soil. Some coal and lignite occur along the southern boundary and these are mined to a limited extent. There are also some deposits of iron ore, but they have never been worked.

AGRICULTURE. The great valley occupying the central portion of the province is well suited to the growing of all crops that can be raised in a cool temperate climate, but because of the peculiar nature of its soil, Manitoba is especially adapted to raising the best varieties of spring wheat, and this crop far outranks in acreage and amount all other cereals. Next in importance to wheat are oats, barley, flax and potatoes.

Hay and forage crops are grown to a considerable extent, and the raising of live stock and dairying are fast becoming important branches of agriculture.

OTHER INDUSTRIES. The lakes and streams abound in fish, and the taking and exporting of whitefish, sturgeon, pickerel and other fish is an important industry. There are but few manufactures, and these consist of such industries as meet the local demands of the population. No large establishments have yet located within the province, but there are numerous small mills for the manufacture of flour, and some lumber mills are engaged in supplying the inhabitants with lumber and timber products.

TRANSPORTATION. The Canadian Pacific railway crosses the province from east to west and has numerous branches extending in various directions from Winnipeg. A branch of the Northern Pacific railroad enters the province from Minnesota and extends to Winnipeg, thus forming connection with the trans-continental lines of the United States and with Saint Paul and Minneapolis. During high water the Red River and the Assiniboine are navigable, though since the construction of railways they are but little used. The Saskatchewan and its outlet, the Nelson, are navigable to Hudson Bay, and with the outlay of comparatively little expense an important ocean route could be developed along this system of rivers.

The commerce of the province consists of the exportation of wheat and other grains to England and the importing of manufactured goods and certain food products not profitably grown within the province.

CITIES. The population of Manitoba in 1911 was 455,614. The principal cities are Winnipeg, the capital, with a population of 136,035, Brandon, with a population of 13,839; St. Boniface, with 7483, and Portage la Prairie, 5892.

GOVERNMENT. The government consists of a lieutenant governor, appointed by the governor-general and council of Canada for a term of five years, and a legislature of one house of 40 members, elected for four years. The common law of England prevails in Manitoba, and English is the official language. The courts consist of a supreme court, with one chief justice and three associates, and inferior courts for each county. Local affairs are managed by counties and townships. Winnipeg is the capital.

EDUCATION. Manitoba maintains an excellent school system and was the first province to follow the example of the United States in setting

apart one section of land in each township for school purposes. The University of Manitoba, which is an examining and degree-conferring body, is at the head of the school system, and it has affiliated with it the various denominational colleges, as well as public schools. There is also a provincial normal school at Winnipeg.

HISTORY. The first settlement in Manitoba was the Selkirk colony on the Red River, a little north of the present city of Winnipeg. Founded in 1812 by the Earl of Selkirk, the colony struggled on for a few years in the face of great opposition from the Northwest Fur Company. In 1821 this company was absorbed by the Hudson's Bay Company, and for nearly 50 years the Canadian Northwest remained in the hands of the fur-traders. The only inhabitants were the *métis* or half-breeds, who trapped and hunted most of the time. When the Northwest was transferred to the Dominion Government in 1869, the *métis*, fearing that their privileges would be withdrawn, resisted the influx of English settlers and rose in rebellion. They organized a republic, with Louis Riel as president. On the arrival of Canadian troops, however, Riel and his followers immediately fled. Meanwhile the Canadian Parliament passed a law making Manitoba a province, and a permanent government was organized in 1870. Since then its progress has been steady, its area has been largely increased, and its population has increased from 25,000 to over 455,000.

Manitoba Lake, a lake of Canada, situated in the Province of Manitoba, s. w. of Lake Winnipeg, about 125 mi. in length by about 25 mi. in breadth and with an area of 1900 sq. mi. It receives the waters of several lakes at its northern extremity, and at its southern it receives those of White Mud River. It discharges into Lake Winnipeg through the Dauphin River.

Manitou, *man'i too*. See **MANITO**.

Manitou, **COL.**, a town of El Paso co., 6 mi. n. w. of Colorado Springs, at the base of Pike's Peak, 6296 feet above the level of the sea. It is a famous health and pleasure resort and is noted for its mineral springs and its beautiful scenery. The place has many canyons and falls, and Monument Park and the Garden of the Gods are here. Population, in summer, over 5000.

Manitoulin, *man i too'lin*, **Islands**, a group of islands in Lake Huron, consisting of Great Manitoulin, 80 mi. long by 5 to 30 mi. broad,

Little Manitoulin, and Drummond Island. The two former belong to Canada; Drummond belongs to the United States. Population, about 2000, more than one-half of whom are Indians.

Manitowoc', **WIS.**, the county-seat of Manitowoc co., 75 mi. n. of Milwaukee, on Lake Michigan at the mouth of the Manitowoc River, and on the Wisconsin Central and the Chicago & Northwestern. It is connected by a boat line with the Pere Marquette railroad, in Michigan. The town has a good harbor and considerable lake commerce, shipping large quantities of grain, flour, dairy products and leather. The industrial establishments include, also, cigar factories, breweries, shipyards, planing mills, brickyards and machine shops. The city contains the James Library, the county insane asylum and a Polish orphanage. It was chartered as a city in 1870. Population in 1910, 13,027.

Manka'to, **MINN.**, the county-seat of Blue Earth co., 90 mi. s. w. of Saint Paul, at the confluence of the Blue Earth and Minnesota rivers and on the Chicago Great Western, the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. It is situated in an agricultural region near valuable stone quarries. The principal manufactures are knit goods, cement, lime, beer, candy, butter, lumber, flour, and foundry and machine shop products. A state normal school is located here, and the city has a Carnegie library, two hospitals, a commercial college, good schools and about a score of churches. The place was settled in 1852, was incorporated six years later and was chartered as a city in 1868. Population in 1910, 10,365.

Mann, **HORACE** (1796-1859), a celebrated American educator, born at Franklin, Mass. During his boyhood and youth he worked on a farm and attended a country school. At the age of twenty he left the farm and began the study of Latin and Greek, after which he entered the Junior class of Brown University. After graduation he studied law and was admitted to the bar, but four years later he was elected to the Massachusetts legislature and was ultimately elected to the Senate. In 1837 Mann was appointed secretary of the Massachusetts board of education, which position he held for twelve years. He devoted his entire time to revising and reorganizing the common school system of the state. He published the *Common School Journal* and a series of annual reports, which exerted great influence toward securing the changes that he desired. In one of

Manna

these reports he compared the systems of instruction followed in Prussia with those in use in Massachusetts. During his term of office he secured the establishing of the Massachusetts state normal schools, the first in the United States, and completely reformed the public



HORACE MANN

school system. In 1848 he was elected to Congress to fill the vacancy caused by the death of John Quincy Adams. During his term he endeavored to have the government establish a national bureau of education at Washington, but this was not done until much later.

Man'na. When the Children of Israel were journeying in the desert, according to the account in *Exodus* xvi and *Numbers* xi, they were fed with a substance which fell from heaven and to which the name *manna* was given. It was small, round and white and had a sweet taste. Each person gathered in the morning enough to last him through the day and no longer, for if it was kept over from one day to the next, it spoiled. On the day before the Sabbath, however, a double portion fell, and on that day it could be kept. When the Israelites entered Canaan, the falling of the manna ceased.

Mannheim, *mahn'hime*, a town of Germany, in the grand duchy of Baden, on the right bank of the Rhine, near its junction with the Neckar. The grand-ducal palace, one of the largest

Mansard Roof

buildings of its kind in Germany, is the most interesting building, and it contains a fine picture gallery and a library. The town has an extensive harbor and docks and is the chief commercial town of the upper Rhine. Its industries include the manufacture of machinery, sugar, chemicals, cigars, varnish and leather. Population in 1911, 193,902.

Man'ning, HENRY EDWARD (1807-1892), a Roman Catholic prelate, born at Totteridge in Hertfordshire and educated at Harrow and at Balliol College, Oxford, and made a Fellow of Merton. He was a leader of the Tractarian party, but in 1851 left the Church of England and joined the Roman Catholic Church. After being ordained priest, he studied several years in Rome, founded the congregation of the Oblates of Saint Charles Borromeo at Bayswater, London, was made archbishop of Westminster in 1865 and cardinal in 1875. Manning worked for the advancement of the Church of England, for the improvement of the people in temperance and education and wrote many articles and pamphlets on the Vatican Council, infallibility and the temporal power of the pope. Before he joined the Catholic communion he published several volumes of sermons.

Man-of-War, a war vessel in the service of a government. A man-of-war is considered a floating piece of the territory of the nation whose flag it carries, and consequently under international law it has greater rights than the ships owned by private persons. See WAR SHIP; PRIVATEER.

Man-of-War Bird. See FRIGATE BIRD.

Manon, *ma noh'N'*, JEANNE PHILIPON, MADAME. See ROLAND DE LA PLATIERE, MARIE.

Mans, *mahN*, LE, a town of France, capital of the Department of Sarthe, on a height above the Sarthe River, 130 mi. s. w. of Paris. The principal building is a fine Gothic cathedral, supposed to be in part a product of the tenth century. The chief manufactures are woolen and linen goods, chemicals, lace, hosiery, tobacco and leather. Le Mans existed in the time of the Romans. It was the birthplace of Henry II, the first of the Plantagenet kings of England, and it witnessed the final dispersion of the Vendean army in 1793. It was the scene also of the defeat of the French army under Chanzy by the Germans under Prince Frederick Charles in January, 1871. Population in 1911, 69,361.

Man'sard Roof, a roof formed with a break in the slope, so that each side has two planes, the lower one approaching more nearly to the

Mansfield

perpendicular than the upper. This kind of roof permits of an upper story in place of an ordinary attic. It received its name from François Mansart, a famous French architect, who introduced it in France.

Mansfield, OHIO, the county-seat of Richland co., 80 mi. s. w. of Cleveland, on the Baltimore & Ohio, the Erie and the Pennsylvania railroads. The city is in an agricultural region, has a large trade and contains manufactures of thrashing machines, boilers, engines, pumps, street cars, electrical appliances and other articles. The important buildings include the Children's Home, a Y. M. C. A. and about twenty-five churches. The Ohio State Reformatory is located here, and the city has a public library, four banks and two business colleges. Mansfield was for many years the home of John Sherman. It was settled in 1808 and was first incorporated in 1828. Population in 1910, 20,768.

Mansfield, RICHARD (1857-1907), an American actor. He was born in Heligoland and



RICHARD MANSFIELD

studied for East Indian civil service; but he came to Boston at the age of seventeen and opened an art studio. In 1875 he returned to England and went on the stage, playing at first small parts in comic opera, then in comedy and later in tragedy. He made his first great hit as Baron Chevrial in *A Parisian Romance*, at the

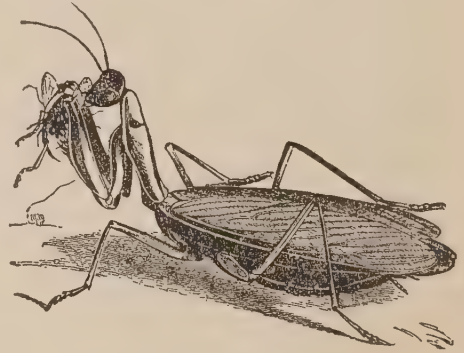
Mantua

Union Square Theatre, New York, and from that time his reputation grew steadily, so that he soon became one of the foremost actors of America. Among his parts were Brutus in *Julius Caesar*, the title rôle in *Richard III*, *Cyrano de Bergerac*, *Dr. Jekyll and Mr. Hyde*, *Beau Brummell* and *Monsieur Beaucaire*.

Manslaughter, *man' slaw tur*. See MURDER.

Man'son, PATRICK (1844-), an English physician, noted for his studies into the cause and treatment of malaria and other tropical diseases. He was one of the first to suggest that the mosquito is active in the transmission of malaria.

Man'tis, a genus of insects, remarkable for their grotesque forms. They frequent trees and



PRAYING MANTIS

plants, and the forms and colors of their bodies and wings are so like the leaves and twigs as to be almost indistinguishable. The praying mantis has received its name because it holds its fore legs in the position of the hands of a person at prayer. In its habits, the mantis is voracious, killing insects and cutting them to pieces. It is a native chiefly of tropical regions, but one species is found in the United States.

Man'tua, a strongly fortified town of northern Italy, capital of the province of the same name, on the Mincio River, 22 mi. s. s. w. of Verona. There are several buildings of historic interest, among them the Palazzo Vecchio, in which Napoleon held his court; and there is a large public library, various museums and a botanic garden. The manufactures are limited, and the trade is chiefly in the hands of the Jews. Mantua is a very ancient city, having been founded, it is said, by the Etruscans before the building of Rome. The Gongazas governed it for about three centuries with great ability and distinguished themselves by the splendor of their court and their patronage of art and literature.



WOOD WORK FROM MANUAL TRAINING SCHOOLS

1. Furniture. 2 and 3. Smaller articles showing handiwork of students.

but on the death of the last duke, in 1708, the duchy was made a part of Austria. Bonaparte captured the city in 1797, but Austria regained possession in 1814. It was united with Italy in 1866. Population in 1911, 32,657.

Manual Training, a department of education that systematically teaches the theory and use of tools, the nature of common materials, and the elementary processes in the more common industrial arts, such as carpentering, wood carving, forging and machine-shop practice. Sewing and cooking, as arts, are properly classed as manual training subjects and are taught in most manual training schools.

The first manual training school in the United States was opened in Saint Louis in 1880, under the direction of Doctor Calvin M. Woodward, as a department of Washington University. Such excellent results were obtained from this school that other large cities established similar schools, either as independent institutions or as departments in existing high schools.

The introduction of manual training into the elementary schools began in 1882, in the Dwight School of Boston. Progress, however, was slight. Many patrons were opposed to the work, because they believed that the time of a school should be devoted to the study of books; also, because of the extra expense for material and because teachers were not prepared to do the work. At first the work lacked system, and the results were very crude; but with the establishing of the Sloyd School of Boston, a way was prepared for the introduction of this system of construction work into the elementary schools. Wherever sloyd was introduced and taught by competent teachers, the results were so satisfactory as highly to recommend it. Modifications of the sloyd system and other systems have followed; and now manual training constitutes a regular feature of the system of instruction in every large city and in more than three-fourths of the cities of 8000 inhabitants in the United States, while a large number of cities below 8000 population have introduced it, either in the elementary schools or in the high school. In 1903 a movement was begun by the National Education Association for the introduction of manual training and elementary agriculture into the rural schools and the schools of small towns and villages. A committee was appointed to investigate the feasibility of such a movement and to prepare plans for carrying it out, provided the work was found feasible. This committee made its report in 1905 and recommended

the introduction of these lines of work into all rural high schools and into consolidated common schools in which there were several grades. The committee also recommended the establishment of secondary schools in rural communities, in which instruction in the elements of agriculture, manual training and domestic economy should be made leading features. The committee did not, however, see its way clear to recommend the general introduction of manual training into one-room schools, because of the lack of suitable apparatus, the crowded condition of programs in such schools and the inability of most teachers of rural schools to do the work.

The great majority of those who favored manual training at the time it was introduced into the public schools of the country advocated it for its utility value, claiming that it gave a training which prepared those taking it to enter upon some definite trade much more readily than would be possible without it. Many of those opposed to it based their opposition on the ground that it had little educational value and that it was no part of the business of the public school system to teach trades. At that time, few of the advocates of manual training saw the possibilities which have since been realized through its development, nor did they claim for it the cultural value which at the present time is generally conceded. Most educational men now concede its value for purposes of training and its right to a place in the public school system.

The change in attitude of those responsible for the introduction of manual training into the public schools is shown by the fact that in the earlier years of its history teachers were sought among artisans, while at the present time it is recognized that the same pedagogical principles apply in teaching manual training that apply in teaching other subjects and that, for the best results, teachers must have special professional training as a preparation for this work. This has led to the establishment of many training schools specially designed to prepare manual training teachers.

The weight of the best educational thought upon this subject is that manual training should be begun at the very beginning of the elementary school work and that it should be continued through the high school period; that the work should not be confined to a single material and the tools necessary in the treatment of that material, but that it should cover a wide range in the use of tools and materials.

The purposes of manual training are (1) to enable the child to enlarge his powers of expression, through the action of the hand, guided and controlled by the action of the mind; (2) to make him acquainted with the nature and use of the most common materials, such as clay, wood, iron and textiles; (3) to lead him to develop a certain degree of skill in the use of tools; (4) to develop his originality, and (5) to connect the work of the school with the affairs of everyday life. To these ends, in the elementary schools the work in drawing, modeling and nature study is all closely identified with manual training.

The work in manual training varies widely in different school systems, as might be expected in the early stages of its development; but the educational values of exercises with different tools and materials are being carefully studied, and this study is resulting in a more definite, rational and systematic organization year by year.

The early argument for manual training, that it has a distinct industrial value for those who may earn a living by their hands, is to-day questioned by few. More general knowledge as to the very large percentage of pupils whose formal education does not extend beyond the elementary schools, and who in later life must earn their living by the use of their hands, is indeed strengthening this argument. Educational men are no longer afraid to advocate the use of something in the public schools which will directly fit the child to earn a livelihood. It is coming to be recognized that the ability to support one's self and those dependent upon one is the first essential of good citizenship, and that therefore the work in public schools in training for citizenship cannot ignore this first essential.

It is not the idea of manual training to teach trades in the elementary schools, but that elementary school pupils should be given such systematic training of the hands, through the manipulation of a wide range of tools and materials, as will accustom them to deal with material things and will enable them, because of their training, to acquire a definite trade more readily and more promptly than they could without such training.

The argument for giving systematic manual training in the public schools because of its cultural value for all pupils, irrespective of what their employment may be after their school days are over, may be briefly stated as follows: The essence of all training is *doing*; the essential feature of manual training is *doing with the*

hands. In systematic manual training, from beginning to end, the motor activities of the hand must be set in operation and must be guided and controlled by the action of the mind. Mental power comes through organized thinking. Organized thinking follows whenever the individual sets himself a definite task to do and then determines and applies the ways and means necessary for the accomplishment of that task. Tools cannot be used successfully upon material to produce a desired result, without the exercise of the closest attention and of those forms of mental activity leading up to an act of judgment. There can be no training of the hand which does not involve mental activity, and the mental activity thus involved is of a kind that furnishes just the training needed for the practical concerns of life.

When properly taught, manual training is of great value, both from the practical and the cultural points of view. From the practical point of view it increases the pupil's power to do, gives him a degree of skill in the use of tools and teaches him the dignity of labor and the value of material. From the cultural point of view, it is of the highest value in the development of the individual, because, first, it demands concentration of attention and thus develops that quality so essential to success in any field of human endeavor; second, it requires organized thinking in the adaptation of means to ends, a demand which will be constant through life; third, it demands an exercise of the will power, resulting in doing for the realization of those ends, and through the doing there comes a clarification of the thinking.

The danger is that it may descend to a single variety of shop work or to training for a particular trade. These are far from the true ends of this system of instruction. It is not the article made, but the power which the pupil acquires in making it, that the practical teacher of manual training seeks; hence, finely finished products are not sought so much as are means of developing the pupil's originality in design and construction. In order that the true ends of manual training may be reached, only teachers who are thoroughly in sympathy with the work and who have received special training for teaching it, should be engaged as teachers of manual training. See *DRAWING; NATURE STUDY; SLOYD; TECHNICAL EDUCATION*.

Consult Ware's *Educational Foundations of Trade and Industry*; Dewey's *The School and Society*; Booker T. Washington's *Working with*

Manures

the Hands; Salomon's *Theory of Educational Sloyd*; Woodward's *Manual Training in Education*; Rouillion's *The Economics of Manual Training*, and the report of the National Education Association's committee on *Industrial Education for Rural Schools* (1905).

Manures', *ma nure's*, substances applied to soil for the purpose of aiding in the production of crops. Manures are divided into natural manures and artificial manures, or commercial fertilizers. By natural manure is usually meant the excrements of farm animals, also called stable manures; but the term may also include green manures, which are growing crops plowed under for the purpose of adding to the organic matter of the soil. Phosphates, lime, saltpeter and a number of compounds of potash are also used, but these are usually called fertilizers. In this article the term *manure* is confined to natural or stable manures.

Plants obtain their food from the air and the soil, and the continued growing of crops tends to exhaust the substances in the soil which are the most important elements of plant food. These are nitrogen, potash and phosphoric acid. Manure is used to restore this loss. It does this directly and indirectly; directly, since it contains the substances needed and sets them free by decomposition; indirectly, since the manure by its decomposition causes such chemical changes in the soil as to liberate the plant-food already there, which the plant alone cannot obtain. Stable manures are injured by exposure to the air and rain and should be kept under cover. They are the most effective when rotted, unless the process is carried on in the open air, when much of the value is lost; therefore, if manure cannot be kept under cover it should be spread upon the land before rotting begins. Manure usually gives the best results when spread evenly over the surface and plowed under or harrowed in.

Stable manures are bulky and are at best three-fourths water. A ton of such manure contains less than forty pounds of plant-food; consequently, good fertilizing requires several tons to the acre. See FERTILIZERS; GUANO.

Man'uscripts, literary writings of any kind, whether on paper or any other material, in contradistinction to printed matter. Although properly including all writings on hard substances, such as stone or baked clay, the term as generally used means only those writings which are on parchment or on paper. The paper of the ancient manuscript is sometimes

Manuscripts

Egyptian, prepared from the real papyrus shrub, sometimes cotton or silk paper, which was invented in the East early in the eighth century A. D. and continued in use until after the invention of linen paper. The most common ink is a black, made of lampblack or burned ivory or bone. Red ink of a dazzling beauty is also found in some ancient manuscripts. With this color were written the initial letters, the first lines and the titles, which were thence called *rubrics*. Blue, green and yellow inks were more rarely used. On rare occasions gold and silver were used, though from their cost they were oftenest confined to initial letters. For the forms in which these ancient manuscripts appear, see the article Book.

The most ancient manuscripts still preserved are those which have been found in Egyptian tombs. Some of them date from 2500 to 3000 B. C. Next to them in point of age are the Latin manuscripts found at Herculaneum. Numerous manuscripts of the Old and New Testaments of the second and third centuries exist; and among those of profane authors may be noted that of Vergil (fourth century), in the Laurentian Library at Florence; a Livy (fifth century), in the Imperial Library of Vienna and the *Jewish Antiquities* of Josephus, in the Ambrosian Library, Milan. See PALIMPSEST.

ILLUMINATED MANUSCRIPTS. The art of illuminating manuscripts dates from the remotest antiquity. The Egyptian papyri were ornamented with vignettes or miniatures attached to the chapters, either designed in black outlines or painted in primary colors. It is supposed that the Egyptians used gold and silver for decorating their manuscripts, but no trace of such work has been found. The oldest ornamented Greek and Roman manuscripts that have survived are the Dioscorides of Vienna and the Vergil of the Vatican, both of the fourth century. From the eighth to the eleventh century, initial letters were composed of figures of men, quadrupeds, fishes and birds, while the initials of the twelfth century were made up of masses of conventional foliage, interspersed with the animal figures of the preceding centuries. Continuous borders, with vignettes and tail-pieces, were also prevalent in later times, and some manuscripts are ornamented with very artistic designs. From the sixth century to the sixteenth, the art of illuminating manuscripts was much practiced in Europe, and the ornamentation was often very complex and very

orilliant. With the invention of printing the art became practically extinct.

Manytch', a river of southeastern Russia, which in its course connects a series of long, narrow salt lakes and joins the Don near Teherkask. Some geographers consider this river valley the dividing line between Europe and Asia.

Manzanillo, *mahn sa nee' lyo*, a seaport on the southern coast of Cuba in the Province of Santiago de Cuba. It has a good roadstead and its coastwise traffic is extensive. The region about it is low and unhealthy. Sugar, tobacco and lumber are the chief exports. Population in 1909, 15,800.

Manzoni, *man zo' ne* ALESSANDRO (1785-1873), an Italian poet and novelist. His chief works are the *Sacred Hymns*; *The Fifth of May*, a powerful ode on the death of Napoleon; the tragedies *Carmagnola* and *Adelechi*, and his great novel *I Promessi Sposi* (The Betrothed).

Maoris, *mah' o reez*, the native inhabitants of New Zealand. They belong to the Polynesian branch of the Malay race and are characterized by their large stature, being above the average, and by their excellent physical development. Tattooing is common among them, and they are also noted for their ornamental and decorative art. Formerly they were among the fiercest cannibals of the South Pacific, but after they were conquered by the British they rapidly adapted themselves to the customs of civilization and are now an intelligent and industrious people.

Map, a projection on a plane surface, representing the whole or part of the earth's surface. Since the earth is a spheroid, its surface cannot be accurately represented on a plane; hence in the drawing of maps systems of outlining, known as projections, have to be used. There are two such systems in general use. One is known as the *polyconic projection*, which is designed from rolling a cone, on which several lines parallel to the base and several perpendicular to the base are drawn, over a plane surface. When the lines parallel to the base are projected on the plane surface by the revolutions of the cone, they form circles, one within the other, and these constitute the meridians of latitude; the lines representing parallels of longitude are straight and radiate from the center. In some form or other this projection is the one most generally used in drawing maps of hemispheres, continents and large countries. It preserves the form of the land masses more accurately than

the other projection, known as *Mercator's*, in which the parallels and meridians are straight lines crossing each other at right angles. The Mercator projection is used for navigators' charts and for drawing certain maps of the world, used to represent commercial routes and the ocean cable lines. It is more simple than the other, and maps are more easily constructed upon it, but the land masses are drawn out of proportion, being too long from east to west as they approach the poles.

Navigators' maps are usually called charts, as are many maps of small areas drawn to show details, though in reality there is but little difference between a map and a chart. All maps are drawn by scale. In the United States the measurement used is inches. In European countries the metric system is generally employed. In drawing a map to a scale, a certain distance, as one inch, represents a certain distance on the surface of the earth, as one hundred miles. Relief maps are made by drawing and coloring, so as to show mountains and valleys, or by modeling, that is, using some material, such as plaster of Paris, putty or papier maché, and constructing maps with the actual elevations, though on such maps the scale of altitudes is much larger than the horizontal scale.

Ma'ple, a name for a family of trees peculiar to the northern and temperate parts of the globe. About fifty species are known, distributed through Europe, North America and different parts of Asia. The maples are characterized by their opposite branches, palmate leaves, with from three to seven lobes, by their full, symmetrical tops, when growing in the open country, by their gray bark and by their hard, fine-grained wood, which is white, or in the older trees, slightly rose-tinted. The *sugar*, or *rock*, maple is the most important species; this yields maple sugar, which in Vermont, northern New York and some parts of Canada, is an important article of manufacture. A tree of ordinary size will yield from fifteen to thirty gallons of sap yearly, from which are made from four to seven pounds of sugar (See SUGAR). The knotted parts of the sugar-maple furnish the pretty *bird's-eye*, or *curled*, maple of cabinet-makers. Some other American species are the *white maple*; the *red*, or *swamp*, maple; the *striped maple*, or *moosewood*; the *mountain maple*, the *vine maple* and the *large-leaved maple*. Two species are common in Great Britain, the *great maple*, often miscalled *sycamore*, and the *common maple*. The wood of

the former is valuable for various purposes, as for carving, turnery, musical instruments and wooden dishes. Another well-known species is the *Norway maple*, often planted in Great Britain as an ornamental tree.

Marabou, *mar a boo'*, a large stork, related to the adjutant bird and inhabiting Africa. It has beautiful, long feathers, which have been much sought for ornaments on ladies' hats. In their wild state the birds live in flocks near rivers. They are easily tamed, though their vigorous appetite makes them destructive to small domestic animals.

Marabouts, *mar a boots'*, among the Berbers of northern Africa, saints or sorcerers, who are held in high estimation and who exercise in some villages a despotic authority. They distribute amulets, affect to work miracles and are thought to exercise the gift of prophecy.

Maracaibo, *mah ra ki'bo*, a seaport of Venezuela, on the west shore of the strait which unites the lake and gulf of the same name. There is a good trade in coffee, cacao, timber, hides and medicinal plants. Population in 1911, about 50,000.

Maracaibo, LAKE, a lake of Venezuela, connected with the Gulf of Venezuela by a channel nine miles wide. The lake is deep, but it cannot be entered by large vessels on account of the bar at its entrance. The waters are generally fresh.

Marajo, *mah ra zho'*, or **Joannes**, an island of Brazil, between the estuaries of the Amazon and Para rivers, belonging to the Province of Para. Its length is about 180 miles, its width, 150 miles, but the population is scanty and consists largely in transient dwellers, who come to the island to hunt or to gather rubber.

Maranhao, *mah ra nyown'*, or **Sao Luiz**, a city of Brazil, capital of the State of Maranhao, situated on the island of Maranhao, opposite the mouth of the Itapicuru. The harbor, which was originally good and permitted the entrance of fairly large vessels, is gradually being filled up with sand, and the trade is consequently declining. The town is regularly laid out and has some interesting buildings, the most noteworthy of which are the cathedral, the episcopal palace, the government buildings and the town house. Population, about 40,000.

Marat, *ma rah'*, **JEAN PAUL** (1744-1793), one of the most famous leaders of the French Revolution. He studied medicine at Paris and spent many years in travel, visiting London, Edinburgh, Dublin and Amsterdam. The out-

break of the revolution brought him to the front, and he became the editor of the *L'Ami du Peuple*, or *Journal de la République Française*. This was the organ of the radicals and soon became the oracle of the mob. It early advocated the most extreme measures, and the tone became more furious as Marat was inflamed by the prosecutions of the authorities. In 1792 he took his seat at the Commune and played a leading part in the assassinations of September, 1792. He was a member of the Committee of Public Safety and of the Convention. The establishment of the revolutionary tribunal and of the committee for arresting the suspected was on his motions. As president of the Jacobin club, he signed an address instigating the people to an insurrection and to the massacre of all traitors. For this Marat was delivered over to the revolutionary tribunal, which acquitted him; and the people received him in triumph and covered him with wreaths. He was assassinated shortly after by Charlotte Corday (See **CORDAY D'ARMONT**, **MARIE ANNE CHARLOTTE**).

Mar'athon, a village of ancient Greece, in Attica, about 20 mi. n. e. of Athens. It was situated on a plain which extends for about six miles along the seashore, and it was on this plain that Miltiades, the Athenian general, defeated Darius with his Persian forces in 490 B. C. It has been called one of the "fifteen decisive battles of the world" (See **FIFTEEN DECISIVE BATTLES**).

Marble, *mahr'b'l*, a crystallized limestone, usually finer grained and harder than the common limestone and capable of receiving a high polish. The crystals are small, but are easily seen by the use of a magnifying glass on a piece of the polished stone. Pure marble is perfectly white, but there are many varieties and colors, owing to the different impurities in the rock. This, however, is an advantage, since the different varieties are suited to many different purposes. Some varieties are also harder and stronger than others, and some will withstand the water better than others. All these varieties are grouped under five classes: (1) pure or single-colored marbles; (2) variegated; (3) brecciated, that is, made of other rocks cemented by limestone; (4) fossiliferous, made wholly or in part of fossils; (5) serpentine, or *verde antique*. Marble is found in a number of localities, but the quarries most widely known are those in Italy, on some islands of the Mediterranean Sea and in the United States. Of the foreign quarries those at Carrara, yielding the cele-

brated Carrara marble, are at present the most widely known. In the United States the most extensive quarries are found in Rutland County, in the southwestern part of Vermont. Other important quarries occur in Georgia and in Tennessee, while very recently valuable quarries have been opened in Alaska.

In the American quarries and marble works most of the work is done by machinery, and there is very little waste, but in the foreign countries the old methods of blasting the rock and cutting by hand are still in vogue. This involves much waste and requires a long time for cutting the stone from its bed. Marble is extensively used for headstones, monuments and for finishing the interiors of buildings.

Marblehead, Mass., a town in Essex co., 18 mi. n. e. of Boston, on a rocky peninsula of Massachusetts Bay and on the Boston & Maine railroad. It was settled by immigrants from Guernsey and Jersey in 1629 and remained for twenty years a part of Salem. Many buildings constructed before the Revolution are still standing in a good state of preservation. The town has a good harbor and was for a time during the early days a settlement second only to Boston. Fishing is yet an important industry, while boat building and the manufacture of shoes are also carried on. The place has become a popular yachting and summer resort. Population in 1910, including several villages, 7338.

Marbles, like tops and balls, have been the playthings of children from time immemorial. The variety of games played with marbles is almost endless and every locality has its own favorite games. In the United States the snow is no sooner off the ground in the northern villages than every boy brings out his marbles and plays vigorously with them for a few weeks, when they disappear suddenly and completely for another year, usually giving way to the more exciting sport of baseball. Most of the common marbles now come from Coburg, in Saxony, where the hard limestone is found. This stone is broken into small cubes, and several hundred of these cubes are placed in grooves cut around a stationary millstone. Revolving on this millstone is a block of oak, which smooths the cubes into rough spheres while water runs over them. Later the marbles are polished in revolving barrels, lined with stone. Three mills, it is said, will manufacture 60,000 marbles in a week. Agate marbles are made at Oberstein by pressing the hot glass into metal molds. The

bull's-eye and striped marbles are molded in clay, then baked, painted and glazed.

Marbury versus Madison, a famous case in the Supreme Court of the United States in 1803, in which for the first time the Supreme Court stated its right to declare a Congressional law null and void because contrary to the Constitution. The case arose over an attempt of Marbury to compel James Madison, in accordance with an act of Congress, to deliver to him a commission as justice of the peace in the District of Columbia. Since the Constitution does not give the Supreme Court original jurisdiction in such cases, the law was clearly unconstitutional and was so declared. Chief Justice Marshall, who delivered the opinion, also stated directly that the Constitution must be supreme over any statute, a rule which was immediately accepted and which constitutes one important peculiarity of the American system of government.

Marcellus, *mahr sel'us*, MARCUS CLAUDIUS, a Roman general, five times consul. He was the first Roman who successfully encountered Hannibal in the second Punic War, and he was the conqueror of Syracuse (212 B. C.). He was killed in a skirmish with the Carthaginians in 208 B. C. On account of his daring and impetuosity Marcellus was called the *Sword of Rome*.

March, originally the first month of the Roman year. Till the adoption of the new style in Britain (1752), the 25th of March was the first day of the legal year; hence January, February and the first twenty-four days of March have frequently two years appended, as Jan. 1, 170 $\frac{1}{2}$, or 1701-2.

Marco'ni, GUGLIELMO (1874-), a celebrated Italian electrician, born near Bologna, Italy, and educated at the University of Bologna. Marconi showed remarkable aptitude for electrical science at an early age. After many experiments he was successful in perfecting instruments which made wireless telegraphy practicable, and to him is due the credit of this invention. Marconi's first wireless telegraph station was established near Cornwall, England. He demonstrated the success of his invention by sending signals across the Atlantic for the first time in 1902. In 1904 the Marconi Company installed a daily news service by wireless telegraphy on the trans-Atlantic liners, and three years later established a public wireless service between England and North America. The Marconi system is now in general use throughout the

Marco Polo

world. Marconi has continued his experiments and has perfected a wireless telephone. His



GUGLIELMO MARCONI

inventions and discoveries won for him the Nobel Prize in physics for 1909.

Marco Polo. See POLO, MARCO.

Marcus Aurelius. See AURELIUS, MARCUS.

Marcy, mahr'sy, WILLIAM LEARNED (1786-1857), an American statesman, born at Southbridge, Mass., educated at Brown University and admitted to the bar. He began the practice of law at Troy, N. Y., but enlisted in the War of 1812, becoming captain in the army but retiring from the service before the close of the war. In 1831 he was chosen United States senator, and in the following year he became governor. During his brief service in the Senate, he was a staunch follower of Andrew Jackson, and was the first to declare the propriety of the rule that "to the victors belong the spoils of the vanquished." He served three terms as governor of New York, became secretary of war in 1845 and under Pierce was secretary of state. In this capacity he settled the Mexican boundary controversy, a fisheries dispute with Great Britain, a reciprocity treaty with Canada, and dispatched Commodore Perry's expedition to Japan.

Mardi Gras, mahr'de grah'. See SHROVE TUESDAY.

Mare Island, an island in San Pablo Bay, near San Francisco, of importance because it is the site of the chief United States naval station on the Pacific. It has a large navy yard, an arsenal, a dry dock and an observatory.

Maria Louisa

Maren'go, BATTLE OF, a famous battle fought near Alessandria, Italy, June 14, 1800, between the French, under Bonaparte, and the Austrians, under General Melas. The Austrians were completely defeated and were obliged to surrender Genoa, Piedmont and Milan. Napoleon's supremacy was firmly established by this victory.

Margaret (1353-1412), queen of Denmark, Norway and Sweden, the daughter of Valdemar IV, king of Denmark. She was married to Haakon, king of Norway. The death of her husband in 1380 placed Norway in her hands, that of her son Olaf in 1387 enabled her to secure the throne of Denmark, to which she had previously brought about his election, and after defeating Albert, the Swedish king, she also obtained possession of the throne of Sweden. She endeavored to place the union of the three kingdoms on a permanent basis by an act of union. Her ability and strength won her the name of the *Semiramis of the North*.

Margarita, mahr ga re'tah, an island belonging to Venezuela, in the Caribbean Sea. Its greatest length is 45 miles, and its greatest breadth is about 20 miles. On the fertile land in the center of the island are produced maize, coffee, cotton and sugar. Pearls were formerly secured off the coast of this island. Margarita was discovered by Columbus in 1498. Population, about 40,000.

Maria Christina, kris te'nah, (1806-1878), queen of Spain, daughter of Francis I of the Two Sicilies. She was the fourth wife of Ferdinand VII of Spain and bore to him in 1830 a daughter, Isabella, who, in virtue of a proclamation issued before her birth, became heir to the kingdom. When Ferdinand died, Maria Christina was made the guardian of the young queen, but when civil war broke out on account of the pretensions of Ferdinand's brother, Don Carlos, to the throne, Maria Christina took little interest in the affair. Her entire attention seemed to center in one of her royal bodyguard, whom in 1833 she married. She became exceedingly unpopular, and in 1840 she was obliged to escape to France. In 1843 she returned to Spain, but eleven years later she was driven from the country. In 1864 she again returned, but was again driven into exile.

Maria Louisa, loo ee'zah, (1791-1847), second wife of Napoleon I, daughter of Francis I of Austria. Her marriage with Napoleon took place in 1810, after the divorce of Josephine, and in 1811 she bore him a son. After his overthrow, she received in 1816 the duchies of

Parma, Piacenza and Guastalla, which she governed till her death.

Mariana, *mah re ah'na*, Islands. See LADRONE ISLANDS.

Maria Theresa, *te re'sah*, (1717–1780), queen of Hungary and Bohemia, archduchess of Austria and wife of the emperor Francis I. On the death of her father, Charles VI, in 1740, she ascended the throne of Hungary, Bohemia and Austria, and a little later she declared her husband joint ruler. Her accession was in accordance with the Pragmatic Sanction, to which her father had secured the consent of the powers of Europe, but her claims were at once contested. Frederick the Great made himself master of Silesia; Spain and Naples gained possession of the Austrian territory in Italy, and the French, Bavarians and Saxons marched into Bohemia, carrying all before them. Charles Albert was proclaimed archduke of Austria and shortly after emperor of Germany; the young queen fled to Pressburg, where she convoked the diet and threw herself upon the sympathy of her Hungarian subjects. The French and Bavarians were speedily driven from her hereditary states; Prussia made a secret peace with the queen, who unwillingly abandoned Silesia to Frederick, and by the Treaty of Aix-la-Chapelle (1748) her husband was declared emperor. During the time of peace which followed, Maria Theresa, with the aid of her husband and her minister Kaunitz, made great financial reforms; agriculture, manufactures and commerce flourished, the national revenue greatly increased and the burdens were diminished. The Seven Years' War again reduced Austria to a state of great exhaustion, but on its conclusion the empress renewed her efforts to promote the prosperity of her dominions. Her son Joseph was elected king of the Romans in 1764, and on the death of her husband, in 1765, she associated the young prince with herself in the government. In 1772 she joined in the dismemberment of Poland, obtaining Galicia for Austria, and in 1777 she acquired Bukowina from Turkey. Of her sixteen children ten survived her, one of whom was the unfortunate Marie Antoinette.

Marie Antoinette, *ma ree' ahN'twan net'*, (1755–1793), archduchess of Austria and queen of France, the youngest daughter of the emperor Francis I and Maria Theresa, born at Vienna. She was married at the age of fifteen to the Dauphin, afterward Louis XVI, but her manners were ill-suited to the French court, and she made many enemies among the highest families by

her contempt for its ceremonies. The freedom of her manners, indeed, even after she became queen, was a cause of scandal. The extraordinary affair of the diamond necklace, in which the Cardinal Louis de Rohan, the great quack Cagliostro and a certain Countess de Lamotte were the chief actors, tarnished her name and



MARIE ANTOINETTE

added force to the calumnies against her. Without doubt, she had great influence over the king, and she constantly opposed all measures of reform. The enthusiastic reception given her at the guard's ball at Versailles on October 1, 1789, raised the general indignation to the highest pitch, and was followed in a few days by the insurrection of women and the attack on Versailles. When practically prisoners in the Tuileries it was she who advised the flight of the royal family in June, 1791, which ended in their capture and return.

On August 10, 1792, she heard her husband's deposition pronounced by the Legislative Assembly and accompanied him to the prison in the Temple, where she displayed the magnanimity of a heroine and the patient endurance of a martyr. In January, 1793, she parted with her husband, who had been condemned by the Convention; in August she was removed to the Conciergerie, and in October she was charged before the revolutionary tribunal with having dissipated the finances, exhausted the treasury,

Marietta

corresponded with the foreign enemies of France and favored the domestic foes of the country. She defended herself with firmness, decision and indignation; and she heard the sentence of death pronounced with perfect calmness—a calmness which did not forsake her when the sentence was carried out the following morning. There has been endless controversy as to the character of Marie Antoinette, and it seems certain that the bitter statements of her detractors are no more to be received absolutely than are the eulogies of those who regard her as a martyr and saint.

Ma'riet'ta, OHIO, the county-seat of Washington co., 125 mi. s. e. of Columbus, on the Ohio River, at the mouth of the Muskingum, and on the Baltimore & Ohio, the Pennsylvania and other railroads. It is the oldest settlement in Ohio, having been founded by Rufus Putnam and a colony from New England under the Ohio Company in 1788. The same year, the government of the Northwest Territory was formally organized here by Governor Arthur Saint Clair. The city is the seat of Marietta College and has a large public library, and, also, the oldest church and the oldest building in the Northwest Territory. Petroleum, coal and iron are found in the vicinity, and there is a large river trade. The manufactures include flour, lumber products, furniture, wagons, harness, glass and other articles. Just twelve miles below the city is Blennerhassett Island, which was the scene of some of the incidents connected with the conspiracy of Aaron Burr (See BURR, AARON). Population in 1910, 12,923.

Mar'igold, a name of several composite plants. The common marigold is a native of France and of the more southern parts of Europe. It is an annual, from one to two feet high, bearing large, deep yellow flowers. It is as prolific as any weed and was formerly used in cookery and as a medicine. A number of species of this genus are indigenous to the Cape of Good Hope. The so-called African marigold and French marigold, common in flower borders, are both Mexican species and have brilliant flowers. The name *marigold* is applied wrongfully to several plants. The English marigold is really a chrysanthemum, and the American marsh marigold belongs to the buttercup family.

Marine Corps, *ma'reen' kore'*, a body of soldiers who serve in the navy of the United States. Originally the sailors sailed the ship, and the fighting was left largely to the soldiers

Mario

who were carried for that particular purpose; to some extent the same custom now prevails, but in a modern warship only about one-seventh are marines. In battle they man the fighting tops and are always used to make up landing parties. They are organized in the same way as the army, and when ashore they garrison the naval stations.

Marine Insurance. See INSURANCE.

Mar'inette', WIS., the county-seat of Marinette co., on Green Bay, at the mouth of the Menominee River opposite Menominee, Mich.,



MARIGOLDS

about 50 mi. n. of the city of Green Bay, on the Wisconsin & Michigan, the Chicago, Milwaukee & Saint Paul and the Chicago & Northwestern railroads. The city has a fine harbor and a large lake trade, especially in lumber. It contains large box factories and manufactories of various other wood products, thrashing machines, engines and other articles. The chief structures are the city and county buildings, two hospitals and a public library. Marinette was settled about 1850 and was incorporated in 1887. Population in 1910, 14,610.

Mario, *mah're o*, GIUSEPPE, Marquis di Candia (1808–1883), a famous Italian tenor,

born at Turin. He entered the Sardinian army in 1830, but deserted and fled to Paris. There, in 1838, under the assumed name of Mario, he became first tenor of the opera. For many years thereafter he divided his time between London, Paris and Saint Petersburg and made two tours of the United States, upon both of which he was received with warm approval.

Mar'ion, IND., the county-seat of Grant co., 65 mi. n. e. of Indianapolis, on the Mississinewa River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Toledo, Saint Louis & Western and other railroads. There are also electric lines to Indianapolis and other cities. A national soldiers' home is just three miles to the south, and the city contains a public library, a fine courthouse and a large normal school. The principal industrial establishments are clock factories, flour, oil and paper mills, foundries and brickyards. Population in 1910, 19,359.

Marion, OHIO, the county-seat of Marion co., 45 mi. n. of Columbus, on the Cleveland, Cincinnati, Chicago & Saint Louis, the Erie, the Pennsylvania and other railroads. The city is in a farming region, has lime kilns and quarries and contains manufactories of steam shovels, engines, thrashers, buggies, carriages, foundry products, agricultural implements and other articles. It has a public library, Sawyer Sanitarium, a normal school, a Y. M. C. A. building and more than a dozen churches. The place was settled chiefly by people from Rhode Island in 1815 and was chartered as a city in 1890. Population in 1910, 18,232.

Marion, FRANCIS (1732-1795), an American Revolutionary commander. He entered the service as a captain, but was rapidly promoted until he became brigadier general. In 1775 he served in a regiment organized by Colonel William Moultrie in his native state of South Carolina, and he accompanied Moultrie on his occupation of Fort Sullivan. Later he commanded Fort Moultrie, took part in the attack on Savannah and then retired to South Carolina. With a cavalry force which he himself had organized in South Carolina, he kept up a guerrilla warfare on the British, and in August, 1780, he won a brilliant victory at Nelson's Ferry. At the Battle of Eutaw Springs he distinguished himself by his daring. After the close of the war he was for some time a member of the state senate and served in the constitutional convention in 1790.

Ma'rius, CAIUS (about 156-86 B. C.), a Roman general, born of obscure parents. He served

with distinction at Numantia in 134 B. C., under Scipio Africanus, was tribune of the people in 119 and acquired much popularity by his opposition to the nobles. In 115 B. C. he was appointed praetor, and a year later he became propraetor of Spain, which he cleared of robbers. In 109 he accompanied the consul Q. Caecilius Metellus, as his lieutenant, to the Jugurthine War, and later he himself was placed in command of the war, which he brought to a successful conclusion. He had been elected consul in 107, and his successes against the barbarians who threatened Rome made him so popular that he was six times reelected to that office. On the outbreak of the war against Mithridates, Marius, who had long been jealous of Sulla, endeavored to deprive him of his command, and in the struggle which followed the former was compelled to flee from Italy. After hairbreadth escapes he landed in Africa and remained there until recalled by Cinna, who had headed a successful movement in his favor. In company with Cinna he marched against Rome, which was obliged to yield, the entry of Marius and his followers being attended with the massacre of most of his chief opponents. On the completion of the term of Cinna's consulship, he declared himself and Marius consuls, 86 B. C., but the latter died seventeen days later.

Mar'joram, a shrub, growing among copse-wood in limy soils of Great Britain, now naturalized in parts of the United States. The leaves are small and pointed; the flowers are reddish and grow in clustered spikes. Sweet marjoram is a biennial, cultivated in gardens. As soon as it blossoms it is cut and dried and is employed as a seasoning.

Mark, a term originally used in Europe, especially Germany and Spain, to designate eight ounces of silver or gold. It is now used commonly as a money of account and since 1873 has been the official monetary unit of the German Empire. It weighs .3982 grams, $\frac{8}{10}$ pure gold, and it is worth about 24 cents in United States money. It is equivalent to $\frac{1}{3}$ of a *thaler* or 100 *pfennige*. Coins in multiples of the unit and of these divisions are issued, also crowns (10 *marks*) and double crowns (20 *marks*). The same name is given to the monetary unit of Finland, which is exactly equal to one French *franc* and is divided into 100 *penni*.

Mark, SAINT, the Evangelist, according to the old ecclesiastical writers, the person known in the *Acts of the Apostles* as "John, whose sur-

Mark Antony

name was Mark" (*Acts* XII, 12, 25), was for many years the companion of Paul and Peter on their journeys. His mother, Mary, was generally in the train of Jesus, and Mark was himself present at a part of the events which he relates in his Gospel and received his information partly from eye-witnesses. He was the cousin of Barnabas (*Col.* iv, 10), and he accompanied Paul and Barnabas to Antioch, Cyprus and Perga in Pamphylia. He returned to Jerusalem, whence he afterward went to Cyprus, and thence to Rome. He was the cause of the memorable "sharp contention" between Paul and Barnabas. The time and place of his death are unknown.

Mark Antony. See ANTONY, MARK.

Mark'ham, EDWIN (1852-), an American poet and educator, born in Oregon City, Ore. He spent his boyhood on a cattle ranch in California, attending country schools whenever he could. In 1871 he entered the San José state normal, and later he graduated from the Christian College, Santa Rosa. He became a prominent California educator and rendered especially valuable service as head master of the Tompkins Observation School at Oakland. From an early age he contributed poems to magazines, but came into prominence at the publication of *The Man with the Hoe* in 1899. Afterward, he lectured widely on existing social problems and wrote numerous articles on the same subjects.

Mark Twain. See CLEMENS, SAMUEL LANGHORNE.

Marl, an earthy substance, essentially composed of carbonate of lime and clay in various proportions. In some marls the proportion of clay is comparatively small, while in others it abounds and furnishes the chief qualities. The most general use of marl is to improve soils. The fertility of any soil depends in a great degree on the suitable proportion of the earths which it contains; and whether a lime or a clay marl will be more suitable to a given soil may be determined with much probability by its tenacity or looseness, moisture or dryness. The quicker action and greater efficiency of slaked lime have in many districts led to its substitution for marl. See FERTILIZERS; SOIL.

Marlboro, *mahr'l bur o*, MASS., a city in Middlesex co., 25 mi. w. of Boston, on the New York, New Haven & Hartford and the Boston & Maine railroads. It was settled in 1646 and was incorporated four years later. In

Marlborough

1676, during King Philip's War, a large part of the town was destroyed by the indians. The important structures are the high school, the city hall, Saint Anne's Convent and Academy and the G. A. R. building. The various manufactures include boots and shoes, machinery, automobiles, bicycles, wagons, electrical supplies, lamps and cigars. Population in 1910, including several villages, 14,579.

Marlborough, JOHN CHURCHILL, First Duke of (1650-1722), an English general and statesman, born at Ashe, in Devonshire. He early entered the army, served on the Continent under Turenne and at the siege of Maestricht distinguished himself so highly as to obtain the public thanks of the king of France. On his return to England he was made lieutenant colonel, and his advancement thereafter was rapid. He strengthened his influence at court, too, by his marriage with Sarah Jennings, an attendant upon the princess, afterward Queen Anne. When William III came to the throne of England, Churchill went over to his side, but in 1691 he was suddenly dismissed from all his employments and committed to the Tower on the charge of treasonable communication with the exiled James II. He soon obtained his release, though it appears that the suspicions against him were not without foundation. When the War of the Spanish Succession broke out, Churchill was made by William commander in chief of the English forces in Holland.

Anne came to the throne in 1702, and through his wife Churchill's influence soon became paramount. In the campaign of 1702 he drove the French out of Spanish Guelders and took Liége and other towns, for which he was created duke of Marlborough. In 1704 he stormed the French and Bavarian lines at Donauwörth, and in the same year, in conjunction with Prince Eugene, he gained the victory of Blenheim over the French and Bavarians. Many honors and gifts were awarded Marlborough for this victory. The years that followed were marked by the brilliant victories at Ramillies and Oudenarde, both won in conjunction with Prince Eugene. In 1709 he won a victory at Malplaquet, but he had lost his popularity. On his next visit to England he found that the duchess, by her arrogance, had so disgusted the queen that a total breach had ensued. On the accession of George I, Marlborough was reinstated in the supreme military command. Throughout the rest of his life, however, he lived in retirement.

Marlowe

Marlowe, *mahr' lo*, CHRISTOPHER (1564-1593), an English dramatist. He settled in London and became an actor, as well as a writer for the stage. His death occurred in a drunken brawl. Besides six tragedies of his own composition, the best known of which are *Tamburlaine the Great*, *Edward II*, *Doctor Faustus* and the *Jew of Malta*, he wrote parts of dramas, collaborating with Nash and perhaps with Shakespeare. Marlowe was by far the greatest dramatic writer before Shakespeare.

Marlowe, JULIA (Mrs. Edward H. Sothern) (1870-), an American actress, born in Cum-



JULIA MARLOWE

berlandshire, England. When she was five years of age her parents removed to the United States, where she afterward resided. She was educated in the public schools and began her career on the stage in her twelfth year, when she joined a juvenile opera company and took part in *Pinafore*, *The Chimes of Normandy* and other light operas. She was christened Sarah Frances Frost, but was known as Frances Brough during her connection with the juvenile company. She later played a child's part in *Rip Van Winkle*, and the next year she took small parts in classic dramas in the Western states. She then retired from the stage and studied for three years in New York. On reëntering theatrical life Miss Marlowe made her début as Parthenia in *Ingomar*. After 1888 she starred in Shakespearean and other rôles and

Marne

was most successful as Viola in *Twelfth Night*, Rosalind in *As You Like It* and Juliet in *Romeo and Juliet*. She married Mr. Robert Tabor, for several seasons the leading man in her company, but she was divorced a short time later. In 1911 she was married to E. H. Sothern, with whom she had played for several years in Shakespearean drama.

Marmora, *mahr' mo ra*, or **Marmara**, SEA or (ancient Propontis), an inland sea, lying between European and Asiatic Turkey, communicating with the Mediterranean by the Dardanelles and with the Black Sea by the Bosphorus. Its greatest length is about 160 miles, its greatest breadth, about 50 miles. It contains several islands, of which the largest is Marmora, famous for its quarries of marble and alabaster.

Marmoset, *mahr' mo zet*, a name of several small South American monkeys, the smallest of the monkey tribe. They are agile in their movements, possess long tails and have a thick, woolly fur. They bear a close resemblance to squirrels in general appearance, feed upon fruit and insects and occasionally upon the smaller birds and their eggs. One species, known as the *silky marmoset*, has a long, silky mane on the head and neck. The marmosets are among the favorite monkeys for exhibition in menageries, for though they are shy they are unusually intelligent. Some of them, however, are unable to survive the cold of even a single northern winter.

Marmot, a small gnawing animal, classed with the squirrels. It lives in Europe, northern Asia and North America. Marmots have thick



LONG-TAILED MARMOT

bodies, short tails and short legs. They live in large communities in long burrows. During the winter they lie in deep sleep. The prairie dog, or prairie marmot, of North America, is the most familiar species. Another species found in America is the woodchuck of the middle states. See PRAIRIE DOG; WOODCHUCK.

Marne, *mahrn*, a river of France, the largest tributary of the Seine on its right. It rises in

Marocco

the plateau of Langres, flows northwest and enters the Seine about three miles above Paris. Of its course of 310 miles about 220 miles are navigable.

Maroc'co. See Morocco.

Marque, mahrk, and Repri'sal, LETTERS OF, a license or commission granted by the supreme power of one State to the citizens of this State to make reprisals at sea on the subjects of another, under pretense of indemnification for injuries received; that is, a license to engage in privateering. Letters of marque were abolished among European nations by the Treaty of Paris of 1856. The United States was invited to accede to this agreement, but declined.

Marquesas, mahr ka'sas, Islands, or Mendana, mayn dah'nya, Islands, a group of volcanic islands in the Pacific Ocean, about 8° 11' south latitude and 140° west longitude. There are thirteen islands and islets, and their joint area is about 480 square miles. The principal products are yams, breadfruit and coconuts. These islands were discovered in 1595, rediscovered in 1791 and named Washington Islands. They became part of French territory in 1842 and are governed by a French commissioner. Population in 1910, 3424.

Marquette, mahr ket', MICH., the county-seat of Marquette co., 58 mi. n. w. of Escanaba, on Marquette Bay of Lake Superior and on the Duluth, South Shore & Atlantic and the Marquette & Southeastern railroads. The city is one of the principal shipping points of ore from the Lake Superior mining region. It has quarries of brown stone, iron works, foundries, machine shops, sash and blind factories, flour and lumber mills and other works. The Northern State Normal School is located here, and the city has a Federal building, a manual training and high school building, an opera house, Peter White Public Library, Episcopal and Roman Catholic cathedrals and the Upper Peninsula State Prison and House of Correction. The place was settled in 1845, when the iron mines were first worked. It was chartered as a city in 1869. Population in 1910, 11,503.

Marquette, JACQUES (1637-1675), a French Jesuit missionary and explorer in America. He came to Canada in 1666, founded Sault Sainte Marie in 1668 and in 1673 accompanied Joliet upon his exploration of the Mississippi. In the following year, Marquette founded a mission among the Illinois Indians, but contracted fever and died before reaching Upper Michigan. His

Marryat

pure character and lofty aims gave him a powerful influence among the Indians with whom he labored. Wisconsin has placed his statue in the rotunda of the Capitol at Washington.

Marriage, mar'rij, an assumed relationship between a man and a woman, by which they are united for life and attain the legal status of husband and wife. Different localities have different forms of the institution, the most broadly marked of which are connected with the right of a man to have only one wife, *monogamy*, or his right to have several wives, *polygamy*. Marriage is now commonly regarded as a civil contract and is held to be valid only when both parties are able and willing to contract according to certain established forms. In the Roman Catholic Church, marriage is considered a sacrament. The Church does not, however, deny the validity of marriage as a civil contract. It does deny its benediction upon the marriage of a Catholic with one of a different religion.

The laws in relation to marriage in the United States are founded mainly on the laws of England. Though the different states have different statutes on the subject, most of them requiring ceremony in the adoption of the relation, there is a consensus of intent that no specific form in marriage is necessary, if the consent of the parties is proved. The old common law marriage of England, which was evidenced by declared intention and acknowledgment in connection with cohabitation, is valid in most states of the Union. In some states the parties are required to obtain a license, which is issued only to those legally capable of marriage. Until recently, the courts of each state recognized as valid a marriage contracted in any other state; but recently the courts of a number of states have refused to recognize the validity of marriages in some others. In this country each state fixes the age of consent, and there is no uniformity of legislation in this respect, though there has recently been a movement toward raising this age, and in most states it is now either sixteen or eighteen years. Minors must obtain the consent of their parents or guardians to the marriage.

The peculiarly sacred character of marriage has distinguished the marriage contract, in the eyes of the law. It cannot be set aside or abrogated by consent of the parties, nor on proof of fraud, except in rare cases. See DIVORCE; HUSBAND AND WIFE.

Mar'ryat, FREDERICK (1792-1848), an English sailor and novelist. He entered the navy as

midshipman when he was but a boy, became a lieutenant at twenty and took part in the War of 1812 against the United States. For saving more than a dozen lives during his naval service, he was given a gold medal by the Royal Humane Society. His experiences on the sea gave him the materials for most of his novels, among which are *Frank Mildmay*, *Peter Simple*, *Mr. Midshipman Easy* and *The Phantom Ship*. Marryat has been called "the Dickens of the sea."

Mars, *mahrz*, the fourth planet from the sun, and because it is next beyond the earth and most nearly like our earth, the one most interesting to us. To the naked eye it appears as a bright star shining with a reddish light. Mars moves round the sun in a little more than 686 of our mean solar days, at an average distance of about 140,000,000 miles, its greatest distance being 152,000,000 miles, and its least, 126,000,000. Its distance from the earth varies from 35,000,000 to 244,000,000 miles, and at its nearest approach to the earth it is about 148 times as far away as the moon. It rotates on its axis in 24 hours, 37 minutes, 22 seconds, and has a diameter of about 4200 miles. As it takes Mars about two years to complete its revolution around the sun, the seasons on the planet are similar to our own, but about twice as long. As Mars is similar in size and of less density, its gravitation is only about one-third of that of the earth, so that a weight of three pounds on the earth's surface would weigh but one pound on the surface of Mars. In 1877 two satellites were discovered by Professor Hall of the Naval Observatory, Washington. These are among the smallest of the heavenly bodies and are supposed to be only about 7 miles in diameter. One revolves about the planet in a period of 30 hours, and the inner one, which was only about 3700 miles from Mars, revolves about it in 9 hours. When examined through a small telescope, Mars appears to have a yellowish surface, marked with indistinct and irregular gray patches. While the surface of the planet generally seems to have a hazy appearance, one of the poles may show a white cap. Under a stronger telescope the irregular patches are shown to be connected by gray lines which intersect in every direction. These patches and lines are constant, and maps have several times been made of them. For a long time it was thought that the gray tract and lines were water, and the lighter portions, land; but now it is quite certain that both are solid, as the surface of both is irregu-

lar, often mountainous. It is thought that water cannot exist upon the planet because the atmosphere, which is thin and light, contains little or no moisture. The caps seen at the poles are probably frost or some condensed gas, for they are only seen during the period which corresponds to our winter. Mars has been the subject of a great deal of speculation and extravagant comment concerning its "canals" and inhabitants, but the scientists know, without a reasonable doubt, that it is impossible for Mars to be populated by beings like ourselves.

Mars, the Roman god of war, called by the Greeks, Ares. He was the son of Jupiter, and like him he was often called *father*, especially by the Romans, who regarded his son Romulus as the founder of their city. He was a fierce and terrible god, who delighted in the rush and noise of battle, and from him kindnesses were never expected. That he was not, however, absolutely unable to feel any softer emotions was shown by his love for Venus. Although he was the god of war and was able to protect his favorite warriors, he



MARS
Villa Ludovisi, Rome.

himself was not invulnerable, but was wounded at various times. Mars was greatly feared, and human sacrifices were sometimes offered on his altar.

Marseillaise, *mahr say yayz'*, **Hymn**, the war-song of the French Republic. The words were written in 1792 by Rouget de l'Isle, an officer in garrison at Strassburg, on the occasion of a body of volunteers leaving that city for the war against Austria and Prussia. The poem was entitled by him *Chant de Guerre de l'Armée du Rhin* (War-Song of the Army of the Rhine). It was called *Marseillaise* because it was first sung in Paris by volunteers from Marseilles.

Marseilles, *mahr saylz'*, (French, *Mar-seille*), a city of France, the principal commercial seaport of the country, on the Mediterranean, capital of the Department of Bouches-du-Rhône. It is situated on the northeastern shore of the Gulf of Lyons, 200 miles southeast of Lyons, and it lies in the form of an amphitheater round a natural harbor of moderate size, now known

as the Old Harbor. The most noteworthy buildings are the cathedral, the episcopal palace, the palace of justice, the ancient church of Saint Victor and the Hôtel de Ville. In recent times, Marseilles has made great progress in its extent, street improvements and commerce, owing largely to the conquest of Algeria and the opening of the Suez Canal. The most important manufactures are soap, soda and other chemical products, olive and other oils, sugar, machinery, iron and brass work, candles, glass, earthenware and furniture. Marseilles was founded by a colony of Greeks from Asia Minor, about 600 B. C. The original name was Massilia. The city was taken by Caesar in 49 B. C., and on the decline of the Roman Empire it became a prey to the Goths, Burgundians and Franks. In 735 it fell into the hands of the Saracens; in the tenth century it came under the dominion of the counts of Provence, and for some centuries after it followed the fortunes of that house. Despite its age the city is thoroughly modern in appearance, and one of the country's principal centers of commerce. Population in 1911, 550,619.

Marsh, a tract of wet land, partially or wholly covered by water. Marshes are formed by springs or rivulets, the flow of whose outlet is obstructed. They may occur on slopes, but are usually found on low and nearly level lands, and they are frequently extensive in alluvial plains along the lower courses of rivers. Salt marshes are found along the shore of the ocean, where the land is low and nearly level. Marshes on hillsides often constitute bogs (See Bog) and quagmires. Sometimes such marshes loosen the soil and cause landslides. Many marshes are the site of peat bogs, and most of them contain more or less muck (See Peat). Good illustrations are the cypress swamps along the Mississippi River in Mississippi and Louisiana.

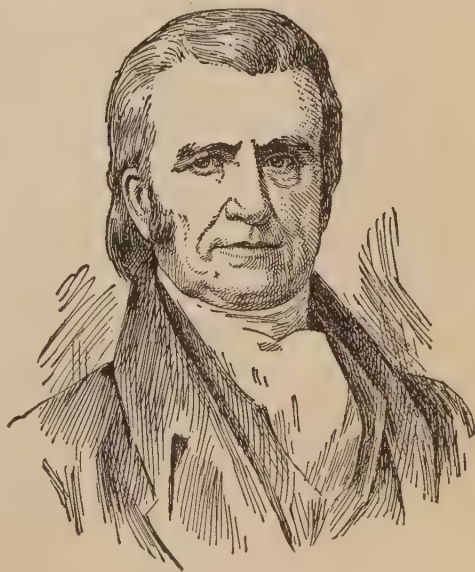
Marshal, *mahr'shal*, a word of German origin, signifying originally a man appointed to take care of horses. The title of marshal in the German Empire had its origin in a similar title under the Frankish monarchs. The marshal had to superintend the ceremonies at the coronation of the emperor and on other high occasions. There is still a marshal at the head of the households of German sovereigns. In France *maréchal de France* is the highest military honor. In Germany *general field marshal* is the highest military honor. In the United States a marshal is an executive officer connected with the Federal courts. The same name

is popularly applied to the chief police officer of a village or small town.

Marshall, Mo., the county-seat of Saline co., 80 mi. e. of Kansas City, on the Chicago & Alton and the Missouri Pacific railroads. The city is near deposits of coal, salt and building stone and has manufactures of flour, lumber, creamery products, brick, tile, wagons and canned goods. The Missouri Valley College, the San Saviour Academy and a state institution for feeble-minded are located here. The city has a fine courthouse and an opera house. It was settled in 1839 and was incorporated as a city in 1866. Population in 1910, 4869.

Marshall, Tex., the county-seat of Harrison co., 45 mi. n. w. of Shreveport, La., on the Texas & Pacific and the Texas Southern railroads. The city is in a fertile agricultural region, producing cotton, fruit and vegetables. It contains foundries, machine shops, cotton presses, lumber mills, carriage works and railroad shops. Wiley University and Bishop College for negroes are located here, and the city has a fine courthouse and an opera house. Population in 1910, 11,452.

Marshall, JOHN (1755-1835), a distinguished American jurist, born at Germantown,



JOHN MARSHALL

Va. He did not go to college, but early began the study of law, which was interrupted only by four years of distinguished service in the Revo-

lutionary War. He was admitted to the bar in 1781, served several terms in the Virginia legislature, and as a member of the Virginia convention was influential in securing the ratification of the Federal Constitution. He was a firm supporter of Washington's administrations, but declined public office under the nation until 1797, when he was sent with Gerry and Pinckney to settle several points of dispute with France. In 1798 Marshall was elected to Congress, became secretary of state in 1800 and from 1801 till his death was chief justice of the United States Supreme Court. In this office he proved himself one of the greatest of the world's jurists, and several of his decisions established extremely important points of interpretation of the Federal Constitution (See DARTMOUTH COLLEGE CASE; MARBURY VERSUS MADISON).

Marshall, THOMAS RILEY (1854-), American lawyer and statesman, born at North Manchester, Indiana. He graduated at Wabash College in 1873, and two years later was admitted to the bar. He was elected governor of Indiana in 1909, and in 1912 was elected vice-president of the United States on the Democratic ticket.

Marshall Niel, *neel*, or **Marechal Niel**, a popular tea rose, cultivated in hothouses. It is a climbing plant and bears pale yellow roses, with soft, light-green leaves.

Mar'shalltown, IOWA, the county-seat of Marshall co., 60 mi. n. e. of Des Moines, on the Chicago Great Western, the Iowa Central and the Chicago & Northwestern railroads. The city is in a stock raising and agricultural region, in which wheat and corn are the chief products. It contains grain elevators, flour mills, glucose works, packing houses, machine shops and other factories. The state soldiers' home is located here. The place was settled in 1860 and was chartered as a city in 1868. Population in 1910, 13,374.

Mar'shalsea Prison, a prison built in the twelfth century and located in Southwark, London. It was at first a king's bench prison, but latterly it served as a poor debtor's prison. In 1849 it was abolished.

Marsh'field, Wis., a city in Wood co., 185 mi. n. w. of Milwaukee, near the center of the state, on the Chicago & Northwestern and the Wisconsin Central railroads. It has a large trade in grain and live stock and extensive manufactures of lumber and lumber products. The city contains a fine city hall, seven churches, a public library, a hospital and a sanatorium. It was settled in 1871 and was chartered as a city in 1883. Population in 1910, 5783.

Marsh Gas. See METHANE.

Marsh Hawk or **Harrier**, a fine, light, bluish-gray hawk, that hunts over marshy regions and wet grounds. It is a long-winged bird, capable of strong flight; it should be favored by agriculturists, because of the great numbers of insects and troublesome animals it destroys. In the spring the male may often be seen performing marvelous aerial evolutions, sometimes almost at the surface of the ground and again far up in the air, in his efforts to attract the female.

Marsh Mal'low, a common European plant, growing in great abundance in marshes, especially near the sea. It is employed medicinally and is used in the preparation of lozenges and confectionery. It is perennial and has a white, fleshy, carrot-shaped root, which may be used as food. The stem is from two to three feet high. Both leaves and stem are covered with soft down, and the flowers are flesh-colored.



MARSH MALLOW

Marsh Tre'foil. See BUCKBEAN.

Marston, *mahr's'ton*, **Moor**, a locality in Yorkshire, England, about 7 mi. west of York, celebrated for the battle between the royal forces, under Prince Rupert, and the troops of Parliament, under Fairfax and Cromwell, July 2, 1644. The royal forces were routed.

Mar'supia'lia, an order of mammals, composed of several families, confined almost wholly to Australia and America, though in geologic times they lived in Europe and more widely everywhere. Marsupial animals live in trees, on the ground or, in a few instances, in water. They are generally like the other mammals, but differ in one striking peculiarity: the young are born in an immature state and are placed immediately by the mother in a pouch, where they attach themselves to the nipples and remain until fully developed. The pouch is permanent and differs in many respects from the temporary pouch of the duck-billed platypus, in which the

Marten

young are hatched from eggs. The young marsupials remain in the pouch until they are clothed with fur and are able to care for themselves, but for some time after they are able to move about they return to the mother's pouch as a refuge. See KANGAROO; OPOSSUM.

Marten, *mahr'ten*, the name of several flesh-eating animals. The body of the marten, like that of the weasel, is elongated and slender. The legs are short, and the feet are provided with five toes, armed with sharp claws. In habit, martens differ from weasels in living in trees, which they climb with great ease. The *pine marten* is found chiefly in Great Britain and Europe. It is of smaller size than the common marten, is of a dark-brown color, with a yellowish mark on the throat, and has fine fur, which is largely used for trimmings. The famous *sable marten*, which furnishes the valuable sable fur, inhabits Siberia, and is nearly allied to the pine marten. *Pennant's marten*, or the *fisher*, as it is popularly called, is another well-known species.

Martha's Vineyard, *vin'yurd*, an island off the coast of Massachusetts, forming the principal part of Dukes County. It is about 4 miles south of the mainland and is 23 miles long and from 2 to 10 miles broad. It contains several towns and seaside resorts.

Martial, *mahr'shal*, in full, MARCUS VALERIUS MARTIALIS, (about 40-about 104), a Roman writer of epigrams, born at Bilbilis, in Spain. He went to Rome when young, during the reign of Nero, and lived there under Galba and the following emperors. Domitian gave him the rank of tribune and the rights of the equestrian order. In 100 A. D. he returned to Spain, to his native city, where he died. His celebrity is founded on fourteen books of epigrams, which for the most part depict with remarkable good sense and pungent wit the life of imperial Rome.

Martial Law, the law by which the discipline of an army is maintained, applying only to persons in actual military service and only to their conduct in such service. The jurisdiction under martial law is vested in a distinct tribunal, known as a court-martial, appointed by some superior officer. Under special circumstances of insurrection or rebellion, where the ordinary law is insufficient to protect life and property, it is sometimes necessary to administer the law according to the practice of military courts, by an armed force occupying the

Martinique

disturbed district. The district is then said to be under martial law.

Martin, a large, purple swallow, common in the United States, where it is widely distributed throughout the summer, though it winters in Central and South America. The male is a beautiful blue-black, and from its large size and vigorous flight it is a conspicuous bird wherever it lives. The martins have become thoroughly accustomed to the presence of man, and they build freely in bird houses or even in the crevices and under the eaves of inhabited buildings. There are several species of true martins, a name which unfortunately is locally given to other birds; for instance, the kingbird is sometimes called the bee martin.

Martineau, *mahr'ty no*, HARRIET (1802-1876), an English author of French Huguenot descent, born at Norwich. She wrote for periodicals, chiefly religious papers, when a girl and when she found herself compelled to earn her living, she turned to literature. In 1834 Miss Martineau visited the United States, and after her return she published *Society in America* and *Western Travel*. In 1839 and 1840 appeared *Deerbrook* and *The Hour and the Man*, two novels, the first of which acquired a wide popularity. *Eastern Life, Past and Present*, the result of a visit made by her to the East, contained a statement of her religious beliefs, which had changed from Unitarianism to agnosticism. Among her other works of importance may be mentioned her *History of England During the Thirty Years' Peace*, *The Playfellow*, children's stories, and the autobiographic *Life in the Sick Room*.

Martineau, JAMES (1805-1900), an English Unitarian minister and writer, brother of Harriet Martineau. He held pastorates in Dublin and in Liverpool, was for years professor of mental and moral philosophy at Manchester New College, and when that institution was removed to London in 1853 he took up his residence in London. In 1868 he became principal of the college. His writings include *The Rationale of Religious Inquiry*, *Unitarianism Defended*, *Endeavors After the Christian Life*, *Hours of Thought on Sacred Things*, *Study of Religion* and *The Seat of Authority in Religion*.

Martinique, *mahr te neck'*, one of the French West India Islands, belonging to the Windward group, 30 mi. s. by w. of Dominica and 20 mi. n. of Saint Lucia. The island is about 39 mi. long and 10 to 15 mi. wide and has an area of 380 sq. mi. The form is irregular and

the coasts are rugged, while the surface is rough and mountainous, culminating in Mont Pelée, which has an altitude of 4500 feet. Like the other islands of the group, Martinique is of volcanic origin. The climate is humid, but not unhealthful. The principal products are sugar cane, coffee, cocoa and tropical fruits. Martinique was discovered by Columbus, and in 1635 it was settled by the French. In 1902, in May and in August, occurred destructive eruptions of Mont Pelée, which destroyed the city of Saint-Pierre, until that time the largest and most important city on the island, and killed from 30,000 to 35,000 people. The population in 1911 was 184,004.

Martinsburg, W. VA., the county-seat of Berkeley co., 75 mi. w. of Washington, on the Baltimore & Ohio and the Cumberland Valley railroads. The town has a fine Federal building, a hospital, a female seminary and a female institute. It is near valuable stone quarries and contains railroad shops, clothing factories, wool and hosiery mills, distilleries, canneries and other factories. As the chief town in the lower Shenandoah Valley, it was an important town in the military operations of the Civil War, and many minor engagements were fought here. Population in 1910, 10,698.

Martin's Ferry, OHIO, a city in Belmont co., on the Ohio River, nearly opposite Wheeling, W. Va., and on the Baltimore & Ohio, the Pennsylvania and other railroads. It is in a region that has deposits of coal, iron and limestone, and it contains manufactures of stoves, shovels, nails, glass and lumber and machine-shop products. The city has an interesting burial place, known as Walnut Grove Cemetery. Martin's Ferry was settled about 1769. Population in 1910, 9133.

Martyrs (witnesses), a name applied by the Christian Church to those persons who, in the early ages of Christianity and during the great persecutions, suffered ignominy and death rather than renounce their faith. Festivals in honor of the martyrs seem to have been observed as early as the second century. The Christians offered prayers at the tombs of the martyrs, thanked God for the example which they had given to the world, delivered eulogies, read accounts of the lives of the deceased and concluded the rites with the sacrament of the Lord's Supper and the distribution of alms.

Marvell, ANDREW (1620-1678), an English political and miscellaneous writer, educated at Trinity College, Cambridge. On the death of

his father he made the tour of Europe and afterward was appointed assistant to Milton in his office of Latin secretary. In 1660 he was chosen a member of Parliament for his native place, which he represented so honorably to the end of his life that he gained the name of the "English Aristides." Besides a small number of musical poems, he composed much humorous and satirical verse.

Marx, *mahrks*, KARL (1818-1883), a German socialist. He studied law and philosophy at Berlin. After editing a liberal paper at Cologne from 1841 till its suppression, he went in 1844 to Paris, where he took part in the publication of the *Deutsch-Französische Jahrbücher* and a liberal newspaper. In 1845 he was compelled to flee to Brussels, and he there became head of the central committee of the socialists. Banished from Germany, he went in 1849 to London, which was his home from that time. In 1864 he established the International Workingmen's Association, which for a time had wide influence. His chief work is *Das Kapital* (Capital), which sets forth his socialistic ideas and is the text-book of modern scientific socialism.

Mary I (1516-1558), queen of England, daughter of Henry VIII by Catharine of Aragon. She ascended the throne on the death of Edward VI, in 1553, after an attempt to set her aside in favor of Lady Jane Grey. One of her first measures was the restoration of the Roman Catholic prelates, who had been superseded in the late reign, and the suppression of all changes in the Church. Her marriage to Philip II of Spain, united as it was with a complete restoration of the Catholic worship, produced much discontent. Under Philip's influence a war began with France, which ended in the loss of Calais in 1558, after it had been in the hands of the English for more than two hundred years. This caused Mary the greatest grief. In the later years of her reign the persecution of the Protestants took place, which won for Mary her title of "Bloody Mary." But the executions, to the number of three hundred, which she sanctioned, were permitted only because she believed the restoration of the Catholic religion to be an absolute necessity and saw no other way of accomplishing it.

Mary II (1662-1694), queen of England, the daughter of James II of England. She was married in 1677 to William, prince of Orange, and when the Revolution dethroned her father, Mary was declared joint possessor of the throne with William.

Mary

Mary, THE VIRGIN, the mother of Jesus. The story of her life, so far as it is given in the New Testament, begins with her betrothal to Joseph and the narrative of the birth of Christ. She is thrice mentioned during Christ's public ministry and once after his death. A tradition asserts that she lived and died at Jerusalem, under the care of John; another that she died at Ephesus, to which she and John had retired from the siege of Jerusalem. She is a perfect type of Christian womanhood.

Maryland, *mer' y land*, the OLD LINE STATE, one of the South Atlantic states, bounded on the n. by Pennsylvania and Delaware, on the e. by Delaware and the Atlantic Ocean, on the s. and s. w. by Virginia and West Virginia, from which it is separated by the Potomac River, and on the w. by West Virginia. The western and southern boundary lines are very irregular. The length of the northern boundary is 235 miles, to which must be added 35 miles for the northern boundary by Delaware, so that the extreme length of the state from the western boundary to the ocean is 270 miles. Its greatest breadth from north to south is 128 miles. The area, including Chesapeake Bay, is 12,327 square miles, but without the bay, 9,941 square miles. Population in 1910, 1,295,400.

SURFACE AND DRAINAGE. Chesapeake Bay and the Susquehanna River divide the state into two portions, known as the eastern and the western shores. The eastern division is low, nearly level, sandy and, withal, fertile. In the north the surface of this division is diversified by a number of low, rounded hills. The western portion of the state is crossed by the Blue Ridge, the central Appalachian and the Alleghany Mountains, making this region decidedly mountainous, though there are no high altitudes, the highest peaks reaching 2500 and 3000 feet. These ranges are nearly parallel and are separated by deep valleys, and the entire region is wooded. The portion of the state lying between the mountains and Chesapeake Bay is rolling and hilly. The mountainous region is celebrated for its beautiful scenery.

The Potomac, flowing along the western and southern borders, is the largest river within the state. The longest stream of importance is the Susquehanna, which crosses the state from the north. Other streams are small, except at their mouths, where many of them have estuaries. Flowing into Chesapeake Bay on the west are the Pawtuxent, the Patapsco, the Gunpowder

Maryland

and the Susquehanna. On the east are the Elk, the Sassafras, the Chester, the Choptank and a number of others. The important tributaries of the Potomac are the Monocacy, the Antietam and the Youghiogheny.

CLIMATE. The climate is mild and healthful. The mean summer temperature is 75°, and the mean winter temperature, 34°. No section is free from snow, and cold waves of short duration occur during the winter months. The average annual rainfall in the western portion is 38 inches, and near the Atlantic coast it is 46 inches.

MINERALS. Coal is found in three regions in the northwestern part of the state, known respectively as the Cumberland, the Georgia Creek and the Frostburg area. The veins vary from one to fourteen feet in thickness and they yield the best quality of bituminous coal. The annual output exceeds 5,000,000 tons. Valuable deposits of iron ore occur in the western part of the state, but these are not extensively worked. Limestone is generally distributed throughout the central part of the state, and granite and marble of excellent quality are found near the head of Chesapeake Bay. Stone from these quarries has been quite extensively used in the public buildings in Washington and for important structures in New York and Philadelphia. Clay suitable for the manufacture of pottery and brick, and an excellent quality of kaolin are found in the central part of the state. Slate, chrome and hydraulic cement also occur in paying quantities. There are numerous springs, and an abundance of potable waters of excellent quality is found.

FISHERIES. The oyster beds of Chesapeake Bay are famed for their size and the excellent quality of their product. Oyster fishing is one of the important industries of the state. The area of the beds exceeds 200 square miles, and during the season over 7000 small vessels are employed in dredging, scraping and tonging for oysters. The output of canned oysters for 1909 was nearly \$1,000,000, while the value of those sold in bulk was equally great. Shad, menhaden, mackerel and crabs are also taken in large quantities.

AGRICULTURE. The eastern shore or that portion of the state between Chesapeake Bay and the ocean is remarkably well suited by soil and climate to the growth of fruit and vegetables, and a large part of this region is devoted to these branches of agricultural industry. Truck farms and fruit orchards prevail. The northern part

of the state is well suited to growing wheat, corn, grass, Irish and sweet potatoes and tobacco. The most important crops are corn, wheat, hay, oats, tobacco and potatoes. In the regions adapted to grazing, considerable numbers of horses, mules and cattle are raised, and dairy farming is practiced to quite an extent.

MANUFACTURES. Maryland is not essentially a manufacturing state, but since 1890 all lines of manufacturing industry have been extended and the value of products has steadily increased. The leading industries are the canning and preserving of fruits and vegetables, canning and preserving oysters and other shellfish, the manufacture of tobacco, slaughtering and meat-packing, the production of iron and steel and foundry and machine-shop products, shipbuilding and the manufacture of textiles. The leading manufacturing interests center in and about Baltimore.

TRANSPORTATION AND COMMERCE. While the Atlantic coast has no good harbors, the coast of Chesapeake Bay affords many excellent harbors for vessels of light draft, and that of Baltimore is open to the largest ocean steamers. The Potomac is navigable as far as Washington, 125 miles. The Baltimore & Ohio, the oldest railway in the country, has lines connecting Baltimore with Philadelphia and Washington and also with the Ohio valley. The Pennsylvania system, the Western Maryland and the Baltimore & Lehigh traverse the state in various directions. The Chesapeake and Ohio Canal extends from Georgetown, D. C., to Cumberland and is still maintained as a common carrier, chiefly for coal. The commerce consists largely in the exportation of fresh and preserved fruits, coal, oysters and other fish and some textiles and iron and steel products, and the importation of raw material, manufactured goods not made in the state and some food products.

GOVERNMENT. The legislature consists of a senate of 27 members, apportioned one to each of 23 counties and 4 to the city of Baltimore, and a house of delegates of 101 members, apportioned among the counties according to population, each of the four districts of Baltimore city having a number of delegates equal to that of the largest county. The members of the senate are elected for four years, but the terms of one-half expire every two years. The members of the house of delegates are elected for two years. The legislative sessions are biennial and are limited to ninety days. The executive authority

is vested in a governor, who is elected for four years; an attorney-general, elected for four years, and a comptroller of the treasury, elected for two years. A treasurer is elected on joint ballot by the legislature, for two years. Appointments are made by the governor and confirmed by the senate. The highest court is a court of appeals, composed of the chief judges of the seven country circuits and the circuit of Baltimore. In each circuit except that of Baltimore, the chief judge and two associates are elected, and they must hold court in each county of the circuit. These courts have both civil and criminal jurisdiction in important cases and are courts of appeal from cases arising in courts of the justices of the peace. Local administration is by counties.

EDUCATION. The public schools of the state are in charge of a board of education and a superintendent of public instruction appointed by the governor. The governor appoints school commissioners for each county, and the county commissioners appoint school trustees for the districts. The law requires ten months of school in each district whenever it is possible for a term of that length to be sustained. Separate schools are provided for white and colored children. The Maryland state normal school is at Baltimore. There is a second normal school at Frostburg and a normal department in Washington College. The important higher institutions of learning are Johns Hopkins University (See **JOHNS HOPKINS UNIVERSITY**), the University of Maryland and the Woman's College, all located at Baltimore; Saint John's College at Annapolis; the agricultural college in Prince George's County; Western Maryland College at Westminster; Washington College, and the Jacob Tome Institute, at Port Deposit.

INSTITUTIONS. Schools for the blind and deaf are located at Baltimore and for the deaf at Frederick. The school for feeble-minded children is at Owings Mills; the hospitals for the insane are at Sykesville and Spring Grove. The penal institutions include the state penitentiary at Baltimore, a house of refuge for boys and a similar institution for girls.

CITIES. The chief cities are Annapolis, the capital; Baltimore, Cumberland, Hagerstown, Frederick and Cambridge, each of which is described under its title.

HISTORY. Maryland was first settled in 1634 by the English, under the auspices of Cecilus Calvert, Lord Baltimore, of England. It was established through the efforts of George

Mary Magdalen

Calvert, first Lord Baltimore, and was intended to be a refuge for persecuted Catholics of England. It was the home of religious toleration from its foundation. Its early history was disturbed by conflicts between the proprietary party and Virginian traders, the former finally being successful. Another source of trouble was the boundary dispute with the heirs of William Penn, which was finally decided in 1767 by the establishment of Mason and Dixon's Line (See MASON AND DIXON'S LINE). In the pre-Revolutionary period, Maryland was aggressive in defense of colonial rights, and she took a prominent part in the Revolutionary War. She was the last to adopt the Articles of Confederation, owing to her insistent demands that the large states relinquish their territorial claims in the northwest (See ORDINANCE OF 1787). She adopted the Federal Constitution in April, 1788. The first half of the nineteenth century witnessed marked progress in Maryland through the establishment of an elaborate policy of internal improvements, including canals, railroads and telegraph lines. During the Civil War Maryland remained loyal to the Union, though a slave-holding state, but sent many soldiers to both armies. Since the close of the war Maryland has been a doubtful state politically, though usually favoring the policies of the Democratic party. Consult William H. Browne's *Maryland*, in the American Commonwealths Series.

Mary Mag'dalen. See MAGDALEN, MARY.

Mary Stu'art (1542-1587), queen of Scotland. She was born at Linlithgow Palace and was the daughter of James V by his queen, Mary of Lorraine, a princess of the family of Guise. Her father dying when she was a few days old, she was proclaimed queen, and the regency was, after some dispute, vested in the earl of Arran. Mary was educated in a French convent, and in 1558 she married the dauphin, afterward Francis II. He died seventeen months after his accession to the crown, and the young queen returned to Scotland. The calamities of Mary began with her marriage to her cousin, Lord Darnley, in 1565. Darnley was a Roman Catholic, and Mary had hoped that his influence might be of help to her in her claims to the English throne; but his weakness and profligacy soon won her contempt. He almost entirely alienated the queen by his complicity in the murder of Rizzio, Mary's Italian councilor, though a reconciliation seemed to be effected between them about the time of the

Mary Stuart

birth of their son, afterward James VI of Scotland and I of England. At the close of the same year, however, Darnley withdrew from the court, and in the meantime the earl of Bothwell had risen high in the queen's favor. Darnley had fallen ill at Glasgow, and Mary visited him and took measures for his removal to Edinburgh. He was there tended by the queen herself; but during the absence of Mary at a masque at Holyrood, the house in which Darnley lay was blown up by gunpowder, and he was killed.



MARY STUART

The circumstances attending this crime were very imperfectly investigated, but popular suspicion pointed to Bothwell as the ringleader in the outrage, and the queen herself was suspected of complicity, suspicion becoming still stronger when she was carried off by Bothwell, with little show of resistance, to his castle of Dunbar, and was married to him. A number of the nobles now banded together against Bothwell, who succeeded in collecting a force; but on Carberry Hill, where the armies met, Bothwell was defeated. The queen was forced to surrender herself to her insurgent nobles, Bothwell making his escape to Denmark. The confederates first conveyed the queen to Loch Leven Castle. A few days later a casket containing eight letters and some poetry, all said to be in the handwriting of the queen, fell into the hands of the confederates. They were held to afford unmistakable evidence of the queen's guilt, and she was forced to sign a document

renouncing the crown of Scotland in favor of her infant son and appointing the earl of Murray regent during her son's minority. After remaining nearly a year in captivity Mary succeeded in making her escape and made an effort for the recovery of her power. Defeated by the regent's forces, she fled to England and wrote to Elizabeth entreating protection and a personal interview; but this the latter refused to grant until Mary should have cleared herself from the charges laid against her by her subjects. For more than eighteen years she continued to be the prisoner of Elizabeth, and in that time the place of her imprisonment was frequently changed, her final prison being Fotheringhay Castle, Northamptonshire. She was at last accused of being implicated in the plot of Babington against Elizabeth's life, was tried by a court of Elizabeth's appointing and was condemned to be executed. There was a long delay before Elizabeth signed the warrant, but this was at last done in February, 1587. Mary received the news with serenity and dignity, which did not desert her on the scaffold. Authorities are more agreed as to the attractions, talents and accomplishments of Mary Stuart than as to her character.

Masho'naland, a region in the northeast of Matabeleland, Africa. The surface is mainly a fertile plateau, 3000 to 5000 feet high and intersected by several rivers. The region has an extremely healthful climate and is in the midst of valuable gold, iron and copper fields. Gold has been found in large quantities, and settlements have grown up in many places. Mauch, a German traveler, discovered many old mines which at one time had been very valuable, especially at a place called Zimbabwe, which was identified with the Ophir of the Bible. Many ruins consisting of old stone structures and walls have been found here, though their origin is not yet known. In 1890 Mashonaland was acquired by the British South Africa Company, and Fort Salisbury was made the seat of administration.

The Mashonas are of the Bantu race and are a peaceful, agricultural class, raising corn, sweet potatoes, rice, indian hemp and tobacco. A common occupation is hunting for gold. Population in 1911, 511,000.

Mask, a covering for the face, used either as a disguise or as a protection. Masks have been worn since ancient times, and their use in the drama originated in the festivities of the Greeks in connection with the processions and cere-

monies attending the worship of Dionysus or Bacchus. In Greek tragedy, which grew out of this worship, masks were common from the first, and later they were used in comedy. They were sometimes only coverings for the face and sometimes covered the whole head, with huge open mouths, provided with metallic mouth-pieces for the purpose of strengthening the voice of the speaker, a device which was necessary because of the great size and the construction of the ancient theaters. In the Roman drama, also, the mask was common. The use of masks at balls and masquerades originated in Italy, where the domino, or half-mask, was worn by the women and was especially popular.

Ma'son, GEORGE (1725-1792), an American politician, born in Stafford County, Va. He was elected to the assembly of Virginia in 1759 and was a leader in the opposition to the British policy. He continued to have great influence throughout the Revolutionary period, but confined his activity to state affairs, as a member of the committee of safety, the constitutional convention and the state legislature. In 1787 he was elected delegate to the Federal constitutional convention and with Patrick Henry of the same state he refused to sign the instrument and exerted his influence against its ratification by Virginia. He was elected United States senator, but declined the office.

Mason, JAMES MURRAY (1798-1871), an American lawyer and politician, born in Fairfax County, Va., and educated at the University of Pennsylvania. He entered politics and was elected to the state legislature, to the national House of Representatives for one term and finally to the United States Senate, where he served from 1847 to 1861. In the latter year he withdrew to assist the secession movement, having been a faithful advocate of the Southern cause and the author of the famous Fugitive Slave Law. In 1861 he was appointed representative of the Confederacy abroad, and, while sailing for Europe in the British steamer *Trent*, he was captured with his colleague, John Slidell, and taken to Boston (See TRENT AFFAIR). After being released, he went to London, where he endeavored to win recognition for the Confederacy, but without success. He returned to America after the war and lived in Canada until 1868, when he removed to Virginia.

Mason, JEREMIAH (1768-1848), an American lawyer and politician, born in Lebanon, Conn., educated at Yale University, and admitted to the bar in 1791. He began the practice of

Mason

law in New Hampshire, residing at Portsmouth after 1797. There he soon won a place at the head of the state bar, though among his rivals were Daniel Webster and other famous lawyers. In 1802 he became attorney-general of the state. In 1813 he was elected to the United States Senate, and there he became conspicuous for his powers as an orator. He resigned in 1817, but thereafter he served at different times in the state legislature. In 1832 he removed to Boston, where he practiced his profession until his death.

Mason, JOHN YOUNG (1799-1859), an American politician, born in Sussex County, Va., educated at the University of North Carolina. He was admitted to the bar, was chosen to numerous important positions upon the bench and in 1844 was made secretary of the navy by President Tyler. In the following administration he became attorney-general, was again transferred to the navy department and in 1853 was appointed minister to France by President Pierce. There he remained until his death and won special fame as a conspicuous member of the famous Ostend Conference (See OSTEND MANIFESTO).

Mason and Dixon's Line, the line which separates the states of Maryland and Pennsylvania. From the time of the grant of the latter territory to William Penn in 1681, there were disputes between the family of Penn and that of the Lords Baltimore, the possessors of Maryland, as to the boundary between the two territories. An agreement was formed in 1763 by which the line was fixed by two English surveyors, Charles Mason and Jeremiah Dixon. Milestones were set up along the whole of this boundary line. Mason and Dixon's line is commonly spoken of as the boundary between the so-called *South* and the *North*, owing to the fact that it was, before the Civil War, the dividing line between the slaveholding and the free territory.

Mason Bee, a bee distinguished from others by the manner in which it constructs the small earthen cells in which it lives. These are made of sand, pebbles, chips, sawdust and other substances, firmly glued together and smoothed on the inside. They are usually made in groups of from 10 to 20. In these the larvae are deposited, with the honey and pollen stored for their food. These bees are of comparatively small size and are dark in color.

Mason City, IOWA, the county-seat of Cerro Gordo co., 90 mi. n. e. of Fort Dodge, on the

Masonry

Chicago Great Western, the Chicago, Milwaukee & Saint Paul and several other railways. The city is in an agricultural and stock-raising region, containing valuable clay and sandstone deposits. It has a large trade in agricultural produce, groceries and fruits. The National Memorial University is located here, and there is a public library, a fine courthouse and an Odd Fellows' Home. The place was settled in 1855. Population in 1910, 11,230.

Ma'sonry, the name commonly given to a secret fraternal organization of ancient origin. It is also called *Freemasonry*, owing to the fact that the members of the society call themselves Free and Accepted Masons. According to legend, the beginnings of Masonry can be traced as far back as the time of King Solomon, and some enthusiasts even declare that it has existed since the building of Noah's Ark. However, its definite history is known to extend only to the sixteenth century. It is now believed to have arisen from the medieval guilds of masons and architects, the most skilled of whom had organizations, bound together by signs and passwords, which represented the secrets of their trade. However, it was not until the beginning of the eighteenth century that permanent lodges were reestablished upon the principles which form the basis of the modern organization. There was then established a grand lodge in England, which was composed of certain grand officers, chosen by the whole body of Masons; past grand officers, and, perhaps, representatives of the subordinate lodges. This body had complete legislative, judicial and executive control of the order. Each of the lesser lodges was governed by a master and several wardens, besides minor officers appointed by the master. The grand lodge, as a supreme governing body, however, soon lost much of its authority, through the establishment of similar lodges in several other countries, including France, Scotland and Ireland. All of these except France established lodges in America, the first being organized about 1730. In the following year Benjamin Franklin became a member. After the American Revolution, the American lodges, feeling that allegiance to foreign grand lodges was inconsistent with allegiance to the newly-formed American government, broke away, and the lodges of each state organized a grand lodge. This principle has been followed since, and there are now 57 such lodges in the United States and Canada.

The fundamental principle of Masonry is a

belief in God and the acceptance of a Book of the Law, which among Christians is the Bible and among Jews is the Old Testament. No lodge can be opened unless the book of the law lies open upon the altar. Masons are also expected to believe in the immortality of the soul and in the resurrection, and peculiarly impressive symbols are used to represent these principles. The order also inculcates moral principles, of which the chief are charity, truth, temperance and justice. Though in the constitution of the order there is no provision for the payment of set or regular dues for the relief of members or others, all Masons are expected to relieve to the extent of their ability brother Masons, their widows and orphans, when in distress.

Secrecy is required under severe oaths of all members, and there are many secret ceremonials and symbols, which are intended to emphasize the precepts of the order. The 58 grand lodges in the United States and Canada had, in 1913, a membership of 1,567,799 of which about 50,000 were in Canada. Besides these, there are 38 grand lodges of colored Masons in the United States and one in Canada, including, all told, about 150,000 members.

Masque or **Mask**, a dramatic entertainment much in favor in the courts of princes during the sixteenth and seventeenth centuries, particularly in England. In its earliest form it is perhaps best described as a masquerade, with an arranged programme of music and dancing and a banquet. The first masque of this kind in England, according to Holinshed's *Chronicles*, was performed in the early part of the sixteenth century, and masques were frequently introduced into the plays of Shakespeare, Beaumont and Fletcher. The parts in the masques of the sixteenth and seventeenth centuries were usually taken by the first personages of the kingdom; at court the king, queen and princes of the blood often performed in them. Under James I the masque assumed a higher character, more care being expended in its preparation. In the writing of such works Ben Jonson takes an important place, his masques, despite much that is frigid and pedantic, having not a little genuine poetry. Inigo Jones was for a number of years exclusively employed upon the decorations and elaborate machinery of the court masques, and Henry Lawes wrote the music for several of them. Milton's *Comus* is, from the literary point of view, the most beautiful of the productions which bear the name of masque,

though it is possibly defective in the matter of spectacle and music. The taste for masques decreased in the reign of Charles I, and after the interruption given to the progress of dramatic art and literature by the civil war they were not again brought into fashion.

Mass, in the Roman Catholic Church, the prayers and ceremonies which accompany the consecration of the eucharist, or all that part of the Catholic service in which the eucharist is offered. At present the mass consists of four chief parts, (1) the introduction, (2) the *offertorium*, or sacrifice, (3) the consecration, (4) the communion. These four chief parts, of which the latter three are considered the most essential, are composed of several smaller parts, each having its proper denomination. They consist of prayers, hymns, shorter and longer passages of the Holy Scriptures and a number of ceremonies, which, as the essential point of the mass is the sacrifice of the Lord, consist partly of symbolical ceremonies commemorative of important circumstances in Jesus Christ's life, or signs of devotion and homage paid to the presence of the Lord in the host. The order of these ceremonies, and of the whole celebration of the mass, is given in the missal, or mass book. Mass can be offered only by a priest, and he must have fasted absolutely from the midnight previous till the morning of the service. Each priest may offer three masses on Christmas, but only one on other days, unless there be a lack of priests, when two masses may be offered on Sunday. *Votive mass* is an extraordinary mass, instead of that of the day, rehearsed on some special occasion. *Low mass* is the ordinary mass, performed by the priest without music. *High mass* is celebrated by the priest, assisted by a deacon and sub-deacon or other clergy, and sung by the choristers, accompanied by the organ and other musical instruments. A mass for the dead is called a *requiem*.

Mas'sachu'set, a confederation of indian tribes which formerly lived along Massachusetts Bay. Although at one time a leading group, they suffered terribly from pestilence and disease, until in 1646 they ceased to have a separate tribal existence.

Massachusetts, the OLD BAY STATE, one of the New England states, bounded on the n. by Vermont and New Hampshire; on the e. by the Atlantic Ocean; on the s. by the Atlantic Ocean, Rhode Island and Connecticut, and on the w. by New York. Its greatest length from east to west is 184 mi., its average breadth is

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48 mi. and its greatest breadth is about 113 mi. The total area is 8266 sq. mi., of which 227 sq. mi. are water. Population in 1910, 3,366,416.

SURFACE AND DRAINAGE. The eastern part of the state is low, rising by slight undulations to a divide which separates the eastern tributaries of the Connecticut from the streams flowing into the Merrimac, or directly to the ocean. That portion of the state extending southward to Buzzard's Bay is especially low and sandy. An extension of this plain forms Cape Cod Peninsula, which is a distinguishing feature of the topography of the state. This encloses between the bend and the main coast a large bay known as Cape Cod Bay. The coast line, which is very irregular, has an extent of nearly 300 miles, not including the shore lines of the islands and smaller inlets. Among the excellent harbors formed by the many indentations are Boston Bay and Buzzard's Bay. To the west of Buzzard's Bay extensions of Narragansett Bay touch the state in two places. South and east of Buzzard's Bay lie several islands, the most noted of these being Martha's Vineyard, Nantucket and the Elizabeth Islands. A ship canal across Cape Cod Peninsula, completed in 1914, connects Cape Cod and Buzzard's bays.

This eastern slope culminates in the west in a plateau, which in some places attains an altitude of 1100 feet. It occupies a large area in the central part of the state, and is a beautiful region, diversified by low ranges of hills, which are outlying sentinels of the White Mountains, and by charming valleys in which are found many clear lakes and ponds with wooded shores. East of the Connecticut the surface slopes gently towards that stream.

West of the Connecticut River the surface rises to the mountains which, under the name of Berkshire Hills, cross the state from north to south. These are an extension of the Green Mountains and consist of two distinct ranges, the Hoosac Mountains and, farther west, the Taconic range, forming the western boundary of the state. These ranges are separated by deep valleys. This combination of hill, valley, stream and lake renders a large part of Massachusetts notable for the beauty of its scenery. In the Connecticut Valley are a number of low, isolated peaks, of which Mount Holyoke and Mount Tom are the most widely known.

All of the rivers have worn deep channels and flow through comparatively broad valleys. The Merrimac, watering the extreme northeastern

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part of the state, is navigable for about 18 miles, but is chiefly important for its water power. Its important tributaries from Massachusetts are the Concord and the Nashua. In the southeastern part of the state, the Taunton, flowing into Narragansett Bay, is the most important stream. The Connecticut crosses the state from north to south and is the largest river. It receives from the east Miller's, the Bachelor and the Chicopee rivers, and from the west the Green, the Deerfield and the Westfield. The Housatonic flows between the Hoosac and Taconic mountains southward into Long Island Sound, and the Hoosac, which rises in the northern part, flows in a northwesterly direction to the Hudson. None of these streams is navigable except for small boats, but all of them, besides many smaller mountain streams, are important for the water power which they furnish, and the location of such manufacturing centers as Lowell, Lawrence, Haverhill, Waltham and other places is due to the falls in the streams where the towns are situated. The state contains a large number of small lakes, usually known as ponds. Industrially these are of little importance, but they add greatly to the beauty of the scenery, and some of them are sources of water supply for neighboring cities.

CLIMATE. The climate is variable, especially along the coast, with prevailing east winds. In the mountainous regions, the winters are rather severe. In the interior, the temperature is more equable. The temperature ranges from 20° below zero to 100° above; the mean annual temperature is 48°; the average rainfall, 44.99 inches.

MINERAL RESOURCES. Massachusetts is not rich in minerals, although it is the leading state in the production of granite and emery. Granite is produced in considerable quantities in several of the eastern counties. Hampden County, a little west of the center on the southern boundary, contains extensive quarries of sandstone. Limestone is quarried in the western part of the state and is used principally in the manufacture of lime. Clay suitable for brick, tile and pottery is quite generally distributed over the state, and in some localities there are valuable slate quarries.

FISHERIES. Massachusetts is one of the leading states in the catching and curing of fish. Many towns along the coast are almost entirely devoted to this industry. Cod, halibut, herring and mackerel are taken off shore in large numbers, while many fishing fleets make peri-

odical voyages to the Grand Banks for the catch of cod. On the south coast are extensive oyster beds, and other varieties of shellfish are also found in this vicinity. At Woods Hole, on Buzzard's Bay, is one of the most important stations of the United States Fish Commission.

AGRICULTURE. The valleys of the Connecticut, the Housatonic and other streams are fertile and well suited to agriculture, but the slopes of the mountains and parts of the hill country consist of a rocky, unproductive soil and are covered with trees, so that agriculture is not a leading industry in Massachusetts. Farming is largely confined to the production of milk, cream, garden truck and the raising of poultry, since these products are in great demand in the numerous cities in the state. Some cereals, hay, tobacco and potatoes are also raised. Fruits, such as apples, pears, plums and peaches, are raised in abundance, but the state is especially noted for its cranberries, which are raised on the marshy lands in the southeastern part.

MANUFACTURES. The abundance of water power and the excellent shipping facilities have combined to make Massachusetts one of the most important manufacturing states. She is now exceeded in this line only by New York, Pennsylvania and Illinois. In the production of cotton and woolen goods and boots and shoes Massachusetts leads all the other states. The great centers of cotton manufacture are Lowell, Lawrence, Fall River and New Bedford. Lawrence is also an important center for the manufacture of woolen goods. The leading cities in the manufacture of shoes are Lynn, Brockton and Haverhill. Waltham contains the largest watch factory in the world. Machinery, tools, electrical apparatus and supplies, hardware and carriages are also made in large quantities. Another important industry in which the state takes first rank is the manufacture of paper from wood pulp. The great paper mills at Holyoke have attained more than a national reputation for the quality of writing paper which they produce, and much of the best book paper is also made within the state. Other industries of less magnitude, but still important, include the manufacture of rugs and carpets, silks, furniture, silverware and jewelry, and slaughtering and meat-packing. The manufacturing centers are widely distributed over the state, though they are most numerous in the eastern portion.

TRANSPORTATION AND COMMERCE. There are good harbors at Boston, New Bedford and Provincetown, which admit the largest ocean steamships. Railways extend through the state in every direction, so that almost every town has railway communication. These lines either belong to, or are connected with, the great systems extending to the west and south and thus afford access to the great markets and sources of supply of raw materials in those regions. The chief railroad center of the state is Boston; Springfield is also important. Both of these cities are connected with two great centers of communication in a neighboring state, New York and Albany. Electric lines connect neighboring towns, and a number of systems have been extended long distances. These lines are multiplying from year to year, and their mileage already exceeds that of the steam railways. Carriage roads are unusually good, so that Massachusetts is well provided with transportation facilities.

The commerce of the state is very extensive, the foreign commerce being exceeded only by that of New York. Of this trade Boston is the great center, and it has direct steamer connection with many of the leading ports of Europe. Boston is not only the chief seaport of New England, but it has been for many years one of the principal outlets for the grain and meat of the west. The extensive commerce of Massachusetts is due largely to the variety and extent of her manufactures. The imports consist largely of wool, hides, fibers and vegetable grasses and other raw materials for the factories, while the exports include cereals, cattle and dressed meats, lumber and cotton from the west and south and fish and all lines of manufactured goods produced in the state.

GOVERNMENT. The legislature, known as the general court, consists of a senate of 40 members and a house of representatives of 240 members, each elected annually. The executive department consists of the governor and the lieutenant governor, also elected annually. The governor is assisted by a council of eight members, elected annually by districts. The judiciary department comprises a supreme court, with a chief justice and six associates, and a superior court, consisting of a chief justice and twenty-two associates. The judges for these courts are appointed by the governor, with the advice and consent of the council. Below these are the municipal and police courts in Boston and large towns and the district courts. Counties have

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probate courts and courts of insolvency. Local government is by township, and it was in Massachusetts that this peculiar form of government originated. The affairs of the town are in the hands of three or five officers, known as selectmen, who, together with other township officials, are elected at the annual town meeting, in which every voter of the town has the right to vote.

EDUCATION. The first free school and the first college in the United States were established in Massachusetts. The state has not only the oldest, but is generally considered to have the best, system of public schools in the Union. There is a state board of education of nine members, appointed by the governor. This board appoints a commissioner of education who is the executive officer of the board, and who has the supervision of all educational work supported in whole or in part by the state. Each town of sufficient size (5000 to 8000 inhabitants) employs a superintendent who devotes his entire time to the schools of that town. Smaller towns combine to form superintendency unions for the employment of superintendents. The state maintains a number of trade schools and special schools for instruction in household arts. The state maintains ten normal schools, which devote their entire time to the training of teachers. There is no state university, but there is a state agricultural college at Amherst. Chief among the higher institutions of learning are Harvard University, Amherst College, Williams College, Massachusetts Institute of Technology, Worcester Polytechnic Institute, Clark University, Clark College, Boston University, Holy Cross College, Boston College and Tufts College. Among the colleges for women are Mount Holyoke College, Wellesley College, Smith College, Radcliffe College, which is closely allied with Harvard University, and Simmons College. In addition to these colleges and universities the state contains a large number of secondary schools, colleges and professional schools.

INSTITUTIONS. The principal schools for the deaf are located at Boston, Northampton and Randolph. There is a large school for the feeble-minded at Waltham and a hospital school for crippled children at Canton. The blind are educated at the Perkins Institute and Massachusetts School for the Blind in Boston. The hospitals for the insane are at Danvers, Medfield, Northampton, Taunton, Westboro and Worcester. There is a reformatory for men at Concord and one for women at Sherborn. The state prison is at Boston.

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CITIES. The most important cities are Boston, the capital; Worcester, Fall River, Lowell, Cambridge, Lynn, Lawrence, New Bedford, Springfield, Haverhill, Gloucester, Somerville, Holyoke and Brockton, each of which is described under its title.

HISTORY. The coast of Massachusetts was probably explored by the Norsemen about 1000 A. D.; by the Cabots in 1497; by Bartholomew Gosnold, who attempted to make a settlement on the Elizabeth Islands in 1601, and by John Smith in 1614. But a permanent settlement was not made until 1620, when about one hundred English Separatists, who had for several years lived in Holland, landed at Plymouth (See **PLYMOUTH COLONY**). In 1630 a company of Puritans, also from England, settled at Salem, and this village, with other settlements, made soon at Boston and elsewhere, formed the Massachusetts Bay Colony. Two contrary principles were conspicuous in the life of the Massachusetts Bay Colony, one an insistence upon political self-government, the other a rigid adherence to religious intolerance. However, some of its leaders were among the most admirable figures in early American history (See **ENDICOTT, JOHN; WINTHROP, JOHN; DUDLEY, THOMAS**). Religious intolerance led to the banishment of Roger Williams and Anne Hutchinson about 1636, the persistent persecution of the Quakers and, later, of the supposed witches. Numerous Indian wars caused great suffering during the seventeenth century. In 1692 Plymouth and Massachusetts Bay were united under a new charter, less liberal than the preceding ones. For other details of the early history of Massachusetts, see **NEW ENGLAND CONFEDERATION; KING PHILIP; WITCHCRAFT**.

During the eighteenth century the colony of Massachusetts experienced rapid development, which was impeded only by the troubles with the French and Indians (See **FRENCH AND INDIAN WARS**), the strife with the king for the maintenance of its charter, and minor boundary disputes with neighboring colonies. Massachusetts led in the pre-Revolutionary struggle, furnishing not only ideas but leaders. It was the scene of some of the most important of the early events of the war (See **BOSTON MASSACRE; BOSTON TEA PARTY; LEXINGTON, BATTLE OF; BUNKER HILL, BATTLE OF**). The first state constitution was adopted in 1780, and it abolished slavery within Massachusetts. The heavy taxes which were imposed on account of the Revolution led to a rebellion in 1786, known as Shays's

Rebellion (See SHAYS'S REBELLION). Massachusetts was among the first to ratify the Constitution (January, 1788), but during the early years of the Republic the state was strongly Anti-Federalist. After 1797, however, Federalism predominated until the downfall of the party, partly on account of the Hartford Convention, with which Massachusetts was closely associated. The anti-slavery movement of later years practically started in Massachusetts, and during the Civil War the state furnished to the Federal army about 160,000 men, its governor, John A. Andrew, being one of the most conspicuous of the "war governors." Since the Civil War the state has been prominent in all reform movements, especially with regard to education, temperance legislation and the laboring classes. It has been almost uniformly Republican in national politics. Consult C. F. Adams's *Massachusetts, Its Historians and History*.

Massachusetts Bay, an indentation on the eastern coast of Massachusetts, bounded on the n. by Cape Anne and on the s. by Cape Cod. The name sometimes includes Cape Cod Bay, also.

Massachusetts Bay Colony, the colony established by a body of English Puritans at the present site of Salem, Mass., in 1628. The first colony consisted of a party of sixty, under the leadership of John Endicott. This company was, from the very first, practically independent of English control, and authority was formally transferred to America in 1630. Massachusetts Bay Colony suffered from sickness, internal dissension and poor management, and later, from the most vigorous religious persecution in American history, causing the separation of many of its prominent members and the establishment of other towns and colonies, notably New Hampshire, Rhode Island and Connecticut.

Massachusetts Institute of Technology, a scientific and industrial school of high grade, established in Boston in 1865. The original plan upon which this school was founded provided not only for the study of principles, but for the training of students in their practical application to various professions and occupations, and it was the first school of high grade established in the United States upon this plan. It now maintains fourteen courses of study, each extending over four years and leading to the degree of Bachelor of Science. These courses are civil engineering, mechanical engineering, mining engineering and metallurgy, architecture,

chemistry, physics, biology, electrical engineering, chemical engineering, general science, sanitary engineering, geology and geodesy, naval architecture and marine engineering and electro-chemistry. The work of each of these departments assists and strengthens that of all the others. There are also postgraduate courses in most of these departments. The institute has a number of laboratories constructed on a very large scale, so that much of the work done in them assumes the proportion of that in actual industrial establishments. This enables the students to solve many problems in a practical way and thus to fit themselves for taking prominent positions in engineering or industrial works. The number of instructors is about 225, and the number of students is about 1500; among these are found representatives from all states in the Union and from about thirty foreign countries.

Mas'sage, or *ma sahzh'*, a form of medical treatment in which the body of the patient, or some particular part of it, is stroked, rubbed, kneaded, pinched, pressed, squeezed and hacked by the hands of a skilled attendant. The effect of this treatment is to assist and stimulate the circulation and to increase the waste-removing action of the lymphatic vessels. The nutrition, not only of the parts acted upon, but of the whole body, is thus improved, swellings are reduced and inflammation decreased. The process, for which half an hour daily is usually sufficient, is performed upon the naked skin by the bare hands of the operator. The attendant needs strong, firm, soft hands and must be carefully trained. Moreover, he should have a sufficient knowledge of anatomy to be able to locate with the fingers a single muscle or group of muscles for treatment, and to trace the direction of the larger vessels and nerve-trunks and act upon them directly. The principal movements should be characterized by a certain uniformity and method. Thus, in stroking the limbs of the patient, the strokes should always be from the extremities toward the heart, not backward and forward in a random way. The treatment has been remarkably successful in cases of nervous disorders of a hysterical kind, and in cases of wasting through imperfect nutrition dependent upon disturbances of stomach, bowels or liver. See OSTEOPATHY.

Mas'sasoit (1580-1661), chief of the Wampanoag Indians. When the whites first knew this tribe, its numbers were small and the people were feeble and ready to make an alliance with the whites. The treaty was not broken for

fifty years, and Massasoit was always faithful. His home was near the site of the present town of Bristol, R. I. At his death his son Philip became king. See KING PHILIP.

Massenet, *mas nay'*, JULES EMILE FREDERIC (1842-1912), a French composer. He studied at the Paris Conservatoire and in 1878 became a professor there. He composed several operas, of which the best-known are *Herodias*, *Don César de Bazan* and *Thais*. They are notable for their fine instrumentation. He is also well known as a song writer.

Mas'sey, GERALD (1828-1907), an English poet, born near Tring, Herefordshire, of poor parents. For some time after he was fifteen years old, he was an errand boy in London. He wrote verse when but a boy, and in 1848 he founded a radical paper, called the *Spirit of Freedom*, some of his writings in which attracted wide attention. Among his published volumes are *The Ballad of Babe Christabel* and *Other Poems*, *My Lyrical Life*, *Shakespeare's Sonnets Never Before Interpreted* and *The Secret Drama of Shakespeare's Sonnets*.

Mas'sillon, OHIO, a city in Stark co., 65 mi. s. of Cleveland and 8 mi. w. of Canton, on the Tuscarawas River and the Ohio Canal and on the Baltimore & Ohio, the Pennsylvania and other railroads. It is in a noted bituminous coal field and has quarries of valuable white sandstone. The industrial establishments include foundries, rolling mills, machine shops, bridge works, potteries, glass works, flour mills and creameries. A state hospital for the insane is located here. The place was founded in 1825, was incorporated as a village in 1853 and became a city in 1868. Population in 1910, 13,879.

Mas'taba, the name applied by the Egyptian Arabs to the tombs of the Memphite dynasties in ancient Egypt. These tombs are oblong structures, with the appearance of a pyramid cut squarely off at the top. The size varies from 19×25 feet to 84×172 feet. Some mastabas are solid, and some are chambered; the latter have a doorway, set in the recess which opens up into the chamber or chapel, often adorned with beautiful mural paintings.

Master and Servant. In law, a servant, in the narrowest sense, is one who owes his services to another for a limited period, but cannot bind the latter by contract. Servants are of two classes, namely, those who engage to perform certain duties for certain wages, and those known as apprentices, who may receive wages

but are at the same time taught a trade. The following are the important rules governing the relations of master and servant in the United States: (1) In the absence of any stipulation or local custom the term of service is presumed to be terminable at the pleasure of either party; (2) if the term of service is stipulated and the contract be broken without justification by the servant, he cannot recover unpaid wages for services already rendered; (3) he may be discharged for immorality, disobedience, gross negligence or gross incompetence, but if he be discharged unjustly he may sue either for wages for services rendered or for these and other damages sustained; (4) the master is liable for damages sustained by the servant in his ordinary labor, when due to the neglect of the master to furnish suitable instruments or conditions, providing that the employe did not realize the danger or had not complained of it within a reasonable time; (5) the master may sue a third party for injuries to his servants, which cause the loss of services; (6) the master is liable for offenses committed by his servants against third parties, if the act was within the scope of the servant's authority.

By recent statutes, known as Employer's Liability Acts, in both England and the United States, the responsibility of employers for the act and offenses of their servants has been extended so as to include, among other things, the responsibility of certain actions of one against another and, especially, the actions of superior employes to their subordinates. See AGENCY.

Master of Arts, an academical honor conferred by the universities of the United States, Germany, Great Britain and other countries upon students, after a course of study and a previous examination in the chief branches of a liberal education, particularly languages, philosophy, mathematics, physics and history. The precise period of the introduction of this title is not known; but even in the twelfth and thirteenth centuries the honor was so highly esteemed in France that the most distinguished men were eager to obtain it. Afterward, when the universities were multiplied, and many abuses crept in, it lost much of its importance.

Mas'tersing'ers (German, *Meistersinger*), the name of a literary guild or association which flourished in Mainz, Strassburg, Augsburg, Nuremberg and various other German cities, in the fourteenth and fifteenth centuries, in some cases surviving even to recent times. The work of this association was the expression in

subjects: algebra, which treats of the relations and properties of numbers by means of the symbols of analysis; analytical geometry, in which the symbols and processes of algebra are applied to geometrical quantities and processes; calculus, which is that part of the science of mathematics which treats of the nature, the values and the relations of a certain number of variable quantities by means of algebraic symbols and processes, and, finally, hypergeometry, an imaginary field in which quantities of more than three dimensions are considered, their relations being determined and expressed by algebraic symbols. *Geometry* is that branch of mathematics which treats of the relations, properties and measurement of solids, surfaces, lines and angles.

Every branch of mathematics can be divided into two parts, pure, or abstract, and applied, or practical, or mixed. *Pure* mathematics treats only of theories and principles, without regard to their application to concrete things. *Applied*, or *mixed*, mathematics considers only those phases of mathematical theories and principles which have direct or practical application to objects or actions in the material world. The principles of applied mathematics have been of invaluable service in the investigation of such physical phenomena as heat, electricity, sound and optics; of kinematics in mechanics; of surveying and geodesy; of navigation, and of astronomy. In fact, almost every discovery in science during recent times has been first evolved through the medium of mathematical formulas.

The science of mathematics, as we know it, was first developed by the Greeks, although the Hindus, Babylonians, Egyptians and Phoenicians had all made some progress in the understanding and organization of the science. There is evidence that some of the most fundamental principles of algebra and the beginnings of a notation had been discovered in Egypt as early as 3000 B. C. It was nearly twenty-five hundred years later that geometry was first formally organized, but during the next three hundred years it was rapidly developed, by Pythagoras, Plato, Euclid, Archimedes and Apollonius. For many centuries after the Roman conquest of Greece, mathematical progress was confined almost wholly to the Orient. During that time the Hindus, represented especially by Aryabhatta and Brahmagupta, began the investigation of the theory of numbers, made considerable progress in algebra, arithmetic, geometry and trigonometry, and first developed the present system

of notation, which is often wrongly attributed to the Arabs. The sixteenth century witnessed the first important mathematical progress in Europe, the advance beginning in Italy. Shortly afterward, there was also an awakening in France, and before the end of the century, through the labors, especially, of Descartes, Kepler, Pascal and Fermet, the science of algebra and elementary geometry had attained almost perfection, the theory of numbers had been wonderfully developed and analytical geometry had appeared. About the same time Leibnitz and Newton simultaneously expounded the theory of calculus, thus vastly extending the domain of mathematics and eventually revolutionizing all science. During modern times little addition has been made to the knowledge of the fundamental principles of mathematics, but they have been applied in a multitude of new ways and forms. Among the important subjects developed during that time are the theory of substitutions, quaternions, imaginary and complex numbers, functions, projective and descriptive geometry.

See articles on all branches of mathematics; also NUMBER; LINE; PLANE; ANGLE; SOLID.

Math'er, COTTON (1663-1728), an American minister and writer, the eldest son of Increase Mather, born in Boston. He graduated at Harvard College in 1678, and in 1684 he was ordained minister in Boston, as colleague of his father. The subject of witchcraft interested him greatly, and in 1689 he published his *Memorable Providences Relating to Witchcraft and Possessions*, which was used as an authority in the persecution and condemnation of nineteen victims burned for witchcraft at Salem in 1692 (See WITCHCRAFT). In 1693 appeared the *Wonders of the Invisible World*, a work intended to convince every one of the reality of witchcraft, and between that time and his death he produced many other works, among them the *Magnalia*, an ecclesiastical history of New England, and *Parentator*, a life of his father. He died with the reputation of having been the greatest scholar and author that America had then produced.

Mather, INCREASE (1639-1723), one of the early presidents of Harvard College, born at Dorchester, Mass. He graduated at Harvard and was ordained a minister. In 1685 he was chosen president of the college, and four years later he was sent to England as agent of the Province of Massachusetts to procure redress of grievances. He held conferences with King

Matsys

James II and with William and Mary and returned to Boston with a new charter providing for the government of the province.

Matsys, *mah't'sise*, QUENTIN (1466-1530), one of the earliest painters of Antwerp. His name is sometimes spelled *Quintin Massys* or *Metsys* or *Messys*. His style was strong; his use of color was remarkable, and his fidelity to minute details, especially in jewels and ornaments, was exceptional. Most of his pictures are religious and are now scattered through the galleries of Europe. In the Museum of Antwerp is his masterpiece, a great triptych representing the burial of Christ.

Matteawan, *mat'te a won'*, N. Y., a village in Dutchess co., 45 mi. n. of New York City and 2 mi. e. of the Hudson River, on Fishkill Creek and on the Newbury, Dutchess & Connecticut railroad. It has a considerable trade in fruit, potatoes and dairy products, and contains hat factories, machine shops, silk mills, novelty works and other establishments. The state hospital for the criminal insane is located here, and the village has several other hospitals and the Howland Library. The place was settled in 1814. Population in 1910, 6727.

Matter, that which occupies space and through which force is manifested. It is also that which makes itself known to us by our bodily senses, though there is believed to exist one kind of matter, at least, which is too subtle to be perceived by the senses (See ETHER). Roughly speaking, matter exists in one of three states—solid, liquid or gaseous—but these are not marked off by any distinct line. See SOLID; GAS; LIQUID.

Mat'terhorn or **Mont Cervin**, a famous mountain of the Alps, on the boundary of the Canton of Valais, Switzerland, and Piedmont, Italy. The peak is in the form of an immense rocky horn and is very difficult of ascent. The height of the peak is 14,837 feet. It was ascended in 1865 by Whympier, Lord Douglas, Hudson and others.

Matthew, *math'u*, SAINT, evangelist and apostle, son of Alphaeus. He was, previous to his call, a publican, or officer of the Roman customs, and, according to tradition, a native of Nazareth. After the ascension of Christ we find him at Jerusalem with the other apostles, but this is the last notice of him in Scripture. Tradition represents him as preaching fifteen years in Jerusalem, then visiting the Ethiopians, Macedonians, Persians and Syrians, and finally suffering martyrdom in Persia.

Mauch Chunk

Matthews, *math'uze*, (JAMES) BRANDER (1852-), an American author and dramatic critic. Noted for his charming personality and style, for his brilliant and feeling analysis of literature and life, Matthews contributed a most valuable addition to American literature by his works of fiction, his literary and dramatic criticisms and his other essays. He was born in New Orleans, La., and graduated from Columbia University and Columbia Law School; instead of practicing law, however, he at once entered upon his career by writing for the magazines. In 1892 he was appointed professor of dramatic literature in Columbia. Prominent in his long list of published works are the following: *Americanisms and Briticisms*; *Aspects of Fiction and Other Ventures in Criticism*; *The Historic Novel*; *Recreations of an Anthologist*; *Tom Paulding*, a story for children; *Vignettes of Manhattan*, containing sketches of New York life; *In the Vestibule Limited* and *The Decision of the Court*, two comedies, to be read rather than acted; *Studies of the Stage and Development of the Drama*, in the field of dramatic criticism.

Matthews, STANLEY (1824-1889), an American jurist, born in Cincinnati, Ohio, and educated at Kenyon College. He was admitted to the bar, entered politics and was chosen to the state senate in 1855. He served in minor commissions during the Civil War and succeeded General Sherman as United States senator in 1877. In 1881 President Garfield appointed him associate justice of the United States Supreme Court.

Mattoon', ILL., a city in Coles co., 75 mi. e. by s. of Springfield, on the Illinois Central and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. It is in an agricultural region, where broom corn is extensively cultivated. The important industrial establishments are railroad shops, and manufactories of brooms, flour, farm implements, carriages and other articles. The principal buildings are the public library, several good schools and churches and the Odd Fellows' Home. Population in 1910, 11,456.

Mauch Chunk, *mawk chunk*, PA., the county-seat of Carlton co., 46 mi. w. by n. of Easton, on the Lehigh River and the Lehigh Canal and on the Lehigh Valley and the Central of New Jersey railroads. It is in the center of a very valuable anthracite coal region. Because of its beautiful surroundings and its fine climate, it is very popular as a summer resort. Among

the interesting features here are a burning mine, and the Summit Hill coal mines, a short distance south of the village, which are famous as the richest in the state. The chief trade is in coal. The industries include foundries and machine shops. Population in 1910, 3952.

Maulmain' or **Moulmein**, a city of Burma, situated on the Gulf of Martaban, at the point where the Salwin, the Attaran and the Gyaing rivers discharge into the gulf. Maulmain has a temperate and equable climate, a beautiful town site and is a good port, except that the harbor is somewhat shallow. It carries on an extensive commerce in teak, rice, cotton and other products of the country. There are also important shipbuilding works. Population in 1901, 58,446.

Maumee', a river in Indiana and Ohio, formed by the junction of the Saint Joseph and the Saint Mary's rivers at Fort Wayne, and emptying into Lake Erie. It is about 150 miles long and flows through the northwestern part of the state. The city of Toledo is situated on its banks, and the river is navigable for 12 miles, to the Maumee Rapids.

Mauna Kea, *mah'oo nah ka' ah*, a volcanic peak in Hawaii, the highest peak in the Pacific Ocean. The mountain is in the shape of a large mound and has an altitude of 13,805 feet. It is surrounded by several cones and is covered with vegetation to within 1000 feet of its summit. During the winter the summit is covered with snow.

Mauna Loa, *mah oo'nah lo'ah*, a celebrated volcano in the Hawaiian Islands, near the center of Hawaii. It is the largest volcano in the world, being 13,760 feet high and having a crater a mile and a half in diameter. The last great eruption occurred in 1880-1881. See VOLCANO.

Maun'dy Thurs'day, the Thursday in Holy Week. It used to be the custom in England and other countries, and it still is in Austria, for the sovereign to wash the feet of a certain number of poor persons and make them presents on this day. James II was the last English sovereign to perform this ceremony in person. Francis Joseph continued it from 1849 to 1888, washing the feet of twelve old men. In Rome the pope washes the feet of some of the bishops. The ceremony commemorates Christ's washing of the apostles' feet.

Maupassant, *mo pa sahN'*, HENRI RENÉ ALBERT GUY DE (1850-1893), a French novelist. After his graduation from the College of

Rouen, he served in the navy department at Paris and as a soldier in the German war. During his service as clerk, he gave much attention to writing, and under the instruction of Flaubert he became steadily more skilful. His short stories, which first won him fame, are among the best, and are by some critics considered the best, of modern short stories. Among his collections of tales are *Mademoiselle Fifi*, *Tales of the Day and Night*, *Yvette* and *Father Milon*, and among his most famous single tales is *The Necklace*. He wrote also a number of novels, among which are *A Life* and *Pierre and Jean*. His work is all morbid, but it is characterized by a wonderful art and by psychological insight. For three years before his death he was partially insane, and his insanity became complete in 1892.

Maurice, *maw'ris*, Duke and Elector of Saxony (1521-1553), a famous German general. He was a Protestant, but on the outbreak of the struggle between Charles V and the Protestants, he joined Charles, hoping thereby to gain the electorate of Saxony, which belonged to his cousin. He won several victories, and as a reward for his services he received the title and estates of the elector of Saxony. Shortly afterwards, perhaps because he realized that he was losing popularity with his subjects and that Protestantism was really in great danger, he deserted Charles and joined the Schmalkaldic League. By his successes he forced Charles to agree to the Treaty of Passau, which granted religious liberty to the Protestants. Maurice was killed in a battle against the margrave of Brandenburg in 1553.

Mauritius, *maw rish'e us*, (formerly Ile de France), a British island in the Indian Ocean, 550 mi. e. of Madagascar. It is oval in form, about 705 square miles in area and is surrounded by coral reefs. The island is composed chiefly of rugged and irregular mountains. Between the mountains and along the coast are large, fertile plains and rich valleys. The climate is pleasant during the cool season, but it is oppressively hot in summer. The principal products are sugar, rice, maize, cotton, coffee, manioc and vegetables. The government is vested in a lieutenant governor and a legislative council. Mauritius was discovered in 1505 by the Portuguese, who retained possession of it until 1598, when it passed to the Dutch. The French took it about 1710, and it was captured by the British in 1810. The principal town is Port Louis, the capital. Popula-

tion in 1911, 370,393, about 3000 of whom are whites.

Maury, *mo re'*, MATTHEW FONTAINE (1806-1873), an American naval officer and hydrographer, born in Virginia. He entered the United States navy in 1825 and later was lamed by an accident, after which he quitted active service afloat for scientific work at the Washington Observatory. He wrote valuable papers on the Gulf Stream, ocean currents and great circle sailing, besides a *Physical Geography of the Sea*, which gave him a wide reputation. At the outbreak of the Civil War he entered the Confederate service, in which he obtained the rank of commodore. After the close of the war he went to Mexico, Russia and England, and in 1868 he became professor of physics in the Virginia Military Institute.

Mausole'um, the tomb of Mausolus, a king of Caria, erected by his wife Artemisia at Halicarnassus in 353 B. C. It became so famous as to be esteemed one of the seven wonders of the world. In modern times the term *mausoleum* is applied to any costly sepulchral edifice.

Maxim, HUDSON (1853-), an American inventor and engineer. He devised a process for printing daily papers in colors, and was the first manufacturer of smokeless gunpowder in the United States. He developed the Maxim-Schupphaus smokeless powder used by the United States government. He has invented also the explosive maximitite, and the Hudson-Maxim automobile torpedo. See TORPEDO.

Maximil'ian (1832-1867), archduke of Austria and emperor of Mexico. In 1863 he was induced by Napoleon, also by a deputation of Mexican notables, to accept the throne of Mexico. With this intention he entered Mexico in 1864. Having become involved in financial and political difficulties, Maximilian, with the approval of Napoleon, resolved to abdicate, but he was induced by the Conservative party to remain. The French army which had supported him withdrew, at the stern demand of the United States government, and after a brief period of fighting the emperor and two of his chief generals were captured and executed.

Maximilian I (1459-1519), Holy Roman emperor. By his marriage with Mary of Burgundy, the heiress of Charles the Bold of Burgundy, he became involved in a war with Louis XI of France, who laid claim to part of Mary's inheritance. By the treaty concluded in 1482, he was forced to surrender Burgundy, Artois and Franche Comté to Louis, but he retained pos-

session of the Netherlands. In 1493 he succeeded his father as emperor, and his participation in the wars with France in Italy lost him Milan.

Max'ims, LEGAL, the term given to certain accepted principles of law, stated in concise language. Many of these are derived from the old Roman law; many have come down from medieval times in Europe; others were formed by early English jurists. A large majority are therefore stated in Latin. Familiar examples are *caveat emptor* (Let the buyer be on his guard); *aequitas sequitur legem* (Equity follows the law); *ubi jus, ibi remedium* (Where there is a right, there is a remedy); *prior tempore, prior jure* (First in time, first by right, or First come, first served).

Max'well, WILLIAM HENRY (1852-), an American educator, born in Ireland. He was educated at Queen's College, Galway, came to America in 1874 and was engaged as teacher in Brooklyn night schools. Later he became assistant superintendent, then superintendent of the Brooklyn public schools. On the consolidation of Brooklyn with New York in 1898, he was elected superintendent of public schools for Greater New York. He is the author of a series of English grammars and of numerous articles in educational periodicals.

May, the fifth month of the year, containing thirty-one days. The first day of May is celebrated in the country districts of England by dancing about a May pole and crowning some young lady "queen of the May." To a more limited extent the day is celebrated in the United States as May Day.

May, PHIL (1864-1903), a British comic newspaper artist, born at Leeds, England. At the age of fifteen he was put in an architect's office, but the work proving uncongenial, he soon gave it up to join a strolling theatrical troupe. While with them, he discovered his talent by making, for advertising purposes, comic portraits of the leading actors of his company. In 1882 he went to London, where he became a regular contributor to the *Saint Stephen's Review*. Afterward he was successively on the staff of the Sydney (Australia) *Bulletin*, the London *Graphic* and *Punch*. He constantly sketched from life and was one of the best of draughtsmen. In depicting boy life in the slums of London, he was especially successful. His best sketches are contained in the following publications: *The Parson and the Painter*, *Phil May's Sketchbook* and *Phil May's Annual*.

Maya, *mah'ya*, a race of Indians living in Yucatan and the adjacent regions of Mexico and Central America. They were partially civilized, resembling in their habits the Aztecs of Mexico. They raised many vegetables, kept bees for their honey and were remarkably skillful in cloth weaving and feather work. The men wore armor in battle, and in times of peace they carried on trade in their sailing vessels, using a kind of money made from shells and pieces of copper. Before the time of the Spanish conquest Yucatan had been covered with cities, whose vast ruins astonished the whites and gave evidence of long occupancy by the Mayas.

May Apple, a common plant of North America, sometimes called the mandrake. Two large leaves are born on a stem a foot or more high. From the fork between them grows a large, handsome flower, with waxy petals, which produces a yellowish, slightly acid, pulpy fruit, about the size of a pigeon's egg. From the root a powerful drug is prepared.

May Beetle. See JUNE BUG.

May'flower, *THE*, the vessel which carried the Pilgrims from Southampton, England, to the shores of Massachusetts in 1620. It arrived in America, after a stormy voyage, in November, but landing was not made until December 11 (new style calendar, December 21). See PILGRIMS.

May Fly, **Day Fly** or **Shad Fly**, a small insect with large fore wings and small hind wings. May flies are known as ephemera, or day flies, because of the extreme shortness of their lives in the perfect state. The larvae and pupae are aquatic and exist for years, until the latter are ready for the final change, when they creep out of the water, generally toward sunset of a summer evening; shortly after leaving the water they shed their whole skin, and after a brief flight, during which they take no food, they die. May flies are a favorite bait for fish and are imitated in artificial flies.

Mayo, CHARLES HORACE (1865—), and WILLIAM JAMES (1861—), two brothers who rank among the foremost surgeons of America. The elder was born at Le Sueur, Minn., the younger at Rochester, and both were educated in the schools of the latter city. William took his medical training at the University of Michigan, and Charles received his at the Chicago Medical College. In 1889, the brothers became part of the staff of the new St. Mary's Hospital, at Rochester, and they made that institution one of the most famous, if not the most famous, in the world. Eminent surgeons journeyed from

all parts of Europe to observe their wonderful skill in operations of all kinds, as many as fifty visitors often being present on one day. A remarkably large proportion of their operations were completely successful, even of those which had never before been attempted.

May'or, the chief magistrate of a city or corporate town in the United States, England, Ireland and the British colonies. In the United States the mayor usually is elected by the qualified voters of the city or town for a certain term of years. The power and authority which mayors possess, being given to them by local regulations, vary widely in different places.

Mays'ville, KY., the county-seat of Mason co., 64 mi. s. e. of Cincinnati, on the Ohio River and on the Chesapeake & Ohio and the Louisville & Nashville railroads. The city is in a fertile, agricultural region and has cotton, flour and lumber mills, foundries, distilleries, tobacco, furniture and shoe factories and other works. There is a public library, and among other prominent buildings are the Odd Fellows' Hall and the Masonic Temple. The place was settled as early as 1784, was incorporated three years later and was made a city in 1833. Population in 1910, 6141.

Mazarin, *ma za raN'*, JULES (1602-1661), a French statesman and cardinal, an Italian by birth. He entered the pope's military service and distinguished himself by diplomatic ability, for which he was rewarded with two canonries and the appointment of nuncio to the court of France. Here he gained the favor of Richelieu and accepted service from the king. He became a naturalized citizen of France and was made a cardinal, and in 1642, when Richelieu died, Mazarin succeeded him. On the death of Louis XIII, he won over the queen regent and made himself master of the nation. The Parlement of Paris denounced his increasing taxation, while the nobility dreaded his supremacy, and the combination of these malcontents resulted in the civil war of the Fronde (See FRONDE). As the immediate result of the conflict, Mazarin had to go into exile, but finally returned to his position at court in 1653.

Mazepp'a, IVAN STEFANOVITCH (1640-1709), a famous leader of the Cossacks. He was of a noble Russian family and entered the service of John Casimir, king of Poland. Discovered in an intrigue with the wife of a Polish noble, he was fastened upon the back of his own horse, which was then driven out into the steppes. The horse carried him back to his home, but he

Mazzini

was ashamed to remain there and joined the Cossacks in the Ukraine. Through his ability he became their leader, and he was made prince of the Ukraine by Peter the Great. Later, however, Mazepa, believing that it might be possible to gain complete independence for the Cossacks, joined Charles XII of Sweden, and after the Battle of Pultowa he was obliged to flee. His history has furnished a subject for paintings, novels, poems and dramas. The most famous of the poems is Byron's *Mazepa*.

Mazzini, *mat se'ne*, GIUSEPPE (1808-1872), an Italian patriot, born at Genoa. He early began writing literary and political essays for periodicals, and as his writings grew more distinctly liberal in tone, the government suppressed several of the papers in which they appeared. Mazzini afterward joined the Carbonari, and as a result of his share in their disturbances he was imprisoned in Savona for some months. On his release he was exiled to Marseilles, but was compelled by the French government to retire into Switzerland. During the following five years he planned and organized various unsuccessful revolutionary movements, until, in 1837, he was expelled by the Swiss authorities and sought refuge in London. During the revolutionary movements of 1848 he proceeded to Italy, served for a time under Garibaldi and when the pope fled from Rome became a triumvir in its short-lived republic and made a heroic defense of the capital against the French, until compelled to surrender. From that time he continued to organize various risings in Italy, and the successful expeditions of Garibaldi were due in part to his labors. His republican principles prevented him from accepting a seat in the Italian parliament, to which he was several times elected. The society of Young Italy was organized by Mazzini.

Meade, *meed*, GEORGE GORDON (1815-1872), an American soldier, born of American parents at Cadiz, Spain. He was educated in Philadelphia, Washington and Baltimore and graduated at West Point in 1835. After serving in the Seminole War, he resigned from the army, became a civil engineer and was employed in government surveys. He reentered the engineering branch of the army in 1842 and served in the Mexican War under General Taylor. He became a captain before the outbreak of the Civil War in 1861 and in August of that year was commissioned brigadier general of volunteers. He served through the Peninsula Campaign, taking a prominent part at Mechanics-

Meadow Lark

ville, Gaines's Mill and Frazer's Farm, and was also present at the second Battle of Bull Run, and, in command of a corps at Antietam, was wounded. For his gallantry Meade was commissioned major general of volunteers.

He performed notable service at Fredericksburg and Chancellorsville, in covering the retreat of the Federal army, and in June, 1863,



GEORGE GORDON MEADE

succeeded Hooker in command of the Army of the Potomac, just at the crucial point in Lee's second invasion of Pennsylvania. Taking up a strong position at Gettysburg, he compelled Lee to give battle (See GETTYSBURG, BATTLE OF). Though winning a notable victory, he failed to pursue the Confederates promptly and thus incurred the censure of some military critics. Meade commanded the Army of the Potomac in Grant's Virginia campaign of 1864-1865, as a major general in the regular army. After the war he commanded various departments, including one of the military districts of the South during reconstruction days. Consult Pennypacker's *General Meade*, in the Great Commanders Series.

Meadow Lark, an American oriole, not related to the lark. It has a most pleasing song. It is a medium-sized bird, with a bronze mottled plumage above and a bright yellow belly, with a rich, black, crescent-shaped collar across its

breast. Its home is in the damp meadows, where it builds an oven-like nest in a hole in the ground. There are four to six eggs. It is one of the earliest of spring birds in the Northern states.

Meadville, *meed'vil*, PA., the county-seat of Crawford co., 105 mi. n. of Pittsburg, on the French Creek and on the Erie and the Bessemer & Lake Erie railroads. The city is in a fertile valley and contains railroad shops, iron works, planing mills, breweries, silk mills and other factories. Allegheny College and the Meadville Theological School are located here. There are four music schools, two hospitals and a public library. Other important structures are the courthouse, the First Methodist Church and the Lafayette Block. It was settled in 1788 and was made a city in 1866. Population in 1910, 12,780.

Meal'y Bug, a scaly insect, so called because of the white powder which covers its body. It is a tropical or sub-tropical insect, though it is occasionally found in some parts of the southern United States, where it often does great injury to oranges. Other species are also enemies to greenhouse plants throughout the temperate regions. They are often accompanied by ants, which help to scatter them in greenhouses by carrying the young bugs to new feeding grounds. They may be exterminated by the use of a kerosene-soap emulsion, well diluted.

Measles, *me'z'ls*, a contagious disease which usually affects a person but once in a life time, generally in his youth. From the time of exposure until the disease makes its appearance in the form of weakness and fever, a period of about two weeks elapses, and the ordinary course of the illness is a week longer. The characteristic feature of the disease is a rash, which consists of little red pimples; they usually appear first on the face and neck and thence spread downward over the body. While the appearance and some of the characteristics of measles are like those of smallpox and scarlet fever, yet there need be no confusion after a day or two. After the rash subsides, the person must be kept from exposure for some little time, as colds bring about serious complications.

Measurement, *mezh'ure ment*. See MEN-SURATION; UNIT; WEIGHTS AND MEASURES.

Measuring Worm, a name given to the small caterpillars of certain moths. They are long and rather slender, and their feet are grouped at the extreme ends of their bodies. Fastening their fore feet, they bring the hind

feet close up to them, thus looping the body above; then raising the head and fore part of the body, they thrust it forward to its full length. From this habit they take the name given above, as well as the names *loopers* and *inch worms*. Some have the habit of thrusting their bodies out from a branch and remaining immovable in almost perfect imitation of a broken twig. Some measuring worms are extremely destructive pests. See CANKERWORM; MIMICRY.

Meat Packing, the general name given to slaughtering animals and preparing from their carcasses the various kinds of meats placed upon the market. The leading centers of meat packing in the United States are Chicago, Kansas City, South Omaha, Saint Joseph, Mo., and New York.

PROCESSES. The animals are brought by rail from the grazing districts or the corn belt. They are unloaded into yards, called stock yards, and sold to the packing houses. Cattle are allowed to rest twenty-four hours before slaughtering, but the hogs and sheep are driven to the abattoirs as soon as sold. The animals are driven up inclined viaducts to the top of the building, where they are killed. As they pass from one process to another, their bodies are worked downward, until, when completely dressed, they are sent to the cooling rooms on the ground floor. The work is done with remarkable rapidity. It requires less than eight minutes to dress a hog and less than forty-five minutes to dress a steer. The combined packing houses of Chicago slaughter and dress twenty hogs per minute. The division of labor is carried so far that each workman does only one thing and consequently becomes very skillful in his work.

By the use of ice, ammonia or brine (See REFRIGERATION), the cooling rooms are kept at a temperature a little above freezing. Here the meat remains until the animal heat is entirely removed. Pork requires about three days for cooling, and after that time it is ready for the finishing processes. Beef, however, remains in the cooler at least eight or ten days before it is ready for the market, if it is to be sold as fresh meat, and some of the choicest cuts are kept for two or three weeks. This is to allow the meat not only to cool, but to become tender, as well. The process is known as "ripening." Beef that is to be shipped in refrigerator cars is usually loaded after three days, because it can be kept as cool in the car as in the packing house.

Meat Packing

PRODUCTS. The different preparations of beef, pork and mutton are too numerous to mention. They may be classed as fresh meats, salt meats, smoked meats, lard, tallow and special preparations, such as canned meats, dried beef and sausage. Each class includes a great variety, but the pork products are far more numerous than the others. After the head is taken off the hog, the sides are cut into ham, side, shoulder, loin and spare rib, if the meat is to be used in this country. If designed for export, it is cut to suit the custom of the country to which it is sent. With us, the loin and spare rib are sold as fresh meat, the hams and shoulder are pickled and smoked, the sides and backs are dry salted or pickled for salt pork and bacon, and the head and trimmings are made into sausage.

SHIPPING. Large quantities of beef, pork and prepared meats are shipped to distant cities and to foreign countries. Prepared meats are shipped in casks, cases and cans, but all fresh meat is transported in refrigerator cars or refrigerator ships. So perfect are these refrigerators that beef shipped from Chicago to Liverpool or any other European port arrives at its destination in a perfect state of preservation.

GOVERNMENT INSPECTION. Before slaughtering, all animals are examined by government inspectors, and any that are diseased or injured are rejected. After slaughtering, all meat is inspected, since some diseases which may escape detection in the live animal are detected in the meat. This rigid inspection is an assurance that all meat that is allowed to be placed on the market is perfectly wholesome. Following exposures of unsanitary conditions and methods in certain departments of the packing business in 1906, Congress passed a law providing for a more strict inspection of meats at government expense.

BY-PRODUCTS. In no industry is there less waste than in meat packing. Everything about the animal is used. The hides are made into leather, glue soap and oils are made from the hoofs and other parts that are not suitable for meat; the intestines are made into "skins" for packing sausages; the blood and offal are converted into fertilizer; combs, knife handles and buttons are made from the horns and hoofs, the hair of cattle, the wool of sheep and the bristles of hogs are of value in the manufacture of numerous articles. The value of hogs' bristles exported each year is over two million

Mechanicsville

dollars, and this is one of the smallest items among the by-products.

The United States produces more meat than any other country, the quantity being about one-third of the world's supply. The average number of animals slaughtered each year is five million five hundred thousand cattle, nine million sheep and thirty million hogs. Chicago is the great center of the industry and prepares nearly two-fifths of the meat produced in the country. See **BACON**; **BEEF**; **BEEF, EXTRACT OF**; **LARD**; **MUTTON**; **PORK**; **SAUSAGE**; **TALLOW**.

Mec'ca or **Mek'ka**, a city of Arabia, about 60 mi. from Jidda, its port on the Red Sea. As the birthplace of Mohammed, it is the holiest city of the Mohammedan world. It stands in a narrow, sandy valley and contains the great mosque enclosing the Kaaba. The city, at the time of the Hajj, or annual pilgrimage to the Kaaba, enjoined by Mohammed on all his followers, is filled with pilgrims, who increase the population from fifty thousand to nearly two hundred thousand. This pilgrimage is the only source of wealth and occupation to the inhabitants of Mecca.

Mechanical, *me kan'ik al*, **Pow'ers**, the simple machines or the elements of which every machine, however complicated, must be constructed; they are the lever, the wheel and axle, the pulley, the inclined plane, the wedge and the screw. Each of these is described under its title.

Mechanics, the term originally used to denote the general principles involved in the construction of machinery. Later the term became separated from all direct connection with practical applications, and it now deals entirely with abstract questions in which the laws of force and motion are involved. In this sense, mechanics is usually divided into *dynamics*, which treats of moving bodies and the forces which produce their motion, and *statics*, which treats of forces compelling bodies to remain at rest. See **DYNAMICS**.

Mechanics' Lien. See **LIEN**.

Mechanicville, N. Y., a village of Saratoga co., on the Hudson River and the Champlain Canal and on the Delaware & Hudson and the Boston & Maine railways, 19 mi. n. of Albany. The water power is abundant, and there are manufactures of woodwork, paper boxes and knit goods. Population in 1910, 6634.

Mechanicsville, **BATTLE OF**, a battle fought at Mechanicsville, 7 mi. from Richmond, Va., June 26, 1862, between a Federal force of about

5000, commanded by General Fitzjohn Porter, and a Confederate force of 10,000, under the personal direction of General Robert E. Lee. The Federals were in a strong position and compelled the Confederates to open the engagement. Two attacks were repulsed, but on the morning of June 27, upon the arrival of General Stonewall Jackson with Confederate reinforcements, General Porter retreated to a stronger position at Gaines's Mill. The loss of the Confederates was about 2000, and that of the Federals, about 360. The battle opened the so-called "Seven Days' Battles" of the Peninsula Campaign.

Mechlin, *meK'lin*, or **Malines**, *mah leen'*, a town of Belgium, on the Dyle, 14 mi. s. s. e. of Antwerp. Its principal buildings are its cathedral, an ancient Gothic structure which contains an altar piece by Van Dyck; the Church of Notre Dame, the Church of Saint John and the archbishop's palace. The manufactures consist of the famous Mechlin lace, felt and straw hats and woolen stuffs and tapestries. Population in 1910, 59,142.

Meck'lenburg Declaration of Independence, a set of resolutions said to have been adopted by a convention of delegates at Charlotte, Mecklenburg Co., N. C., May 20, 1775. The phraseology of the resolutions is very similar to that of the Declaration of Independence of the Continental Congress, and it thus led to a long discussion as to the originality of Jefferson's document. The weight of historical evidence is now opposed to the claim that these resolutions formed the basis of the Declaration of Independence of 1776.

Mede'a, in Greek mythology, daughter of Aetes, king of Colchis, on the eastern coast of the Black Sea. After helping Jason to obtain the Golden Fleece, she fled with him, and to retard her father in his pursuit of them, she is said to have killed her young brother, Absyrtus, whom she had carried away with her, and to have scattered his limbs on the sea. On arriving with Jason in Thessaly, Medea, through her sorceries, put to death Pelias, Jason's uncle, who had kept him from his kingdom, and together they reigned for years. When Jason, however, deserted Medea for Glauce, the sorceress sent to her rival a poisoned robe, which caused her death, and afterward Medea put to death her own children. She then, in her dragon car, mounted into the air and disappeared.

Medellin, *ma da lyeen'*, a city of Colombia, capital of Antioquia department, 40 mi. s. e. of

Antioquia. It is chiefly noteworthy as the center of the gold-mining industry of the province. Population, about 50,000.

Med'ford, **MASS.**, a city in Middlesex co., 5 mi. n. of Boston, on the Mystic River and on the Boston & Maine railroad. It is the seat of Tufts College and is a popular residence suburb of Boston. The city has several buildings that are historically interesting, among which is the Cradock House, built in 1634, supposed to be the oldest intact structure in the United States. The industrial establishments include carriage works, brickyards, and manufactures of machinery, chemicals and other articles. The place was settled in 1630 and was chartered as a city in 1892. Population in 1910, including several villages, 23,150.

Me'dia, an ancient country in western Asia, formerly the seat of a powerful kingdom. It was bounded on the n. by the Caspian Sea, on the e. by Parthia, on the s. by Persia and on the w. by Assyria. The Medians were conquered by Assyria at an early date and assisted in the later conquests of the Assyrians. In 625, however, together with the Babylonians, they revolted, under the leadership of Cyaxeres, and while they were absent at the siege of Nineveh, the Scythians invaded Media. Not until more than twenty years later were they able to drive out the Scythians, but when they again turned their attention to the conquest of Assyria, they were successful, and that empire was divided between the Medes and Babylonians. Under Astyages Media gained control over Persia, but Cyrus the Great in 558 conquered Media and established the Medo-Persian Empire. See **ASSYRIA**; **PERSIA**.

Med'ical Ju'rispru'dence, also called **Forensic Medicine**, brings medical science to bear on legal questions, in determining criminal and civil responsibility. It has regard, mainly, either to civil rights or to injuries to the person. Among subjects in its province are those connected with birth, murder, natural death, insanity, monstrosity, accidental or intentional injuries and the action of drugs. In the courts of the United States either side of a case may hire its own experts, but in other countries the practice is regulated so that not often do opposing experts contradict themselves.

Medical Schools, institutions established for the purpose of giving professional training to physicians and surgeons. The first medical school of which we have any record was established at Salerno in the tenth century. When

Medici

the great universities of Europe were established, medical schools became departments of them. This custom was introduced into England, and it has now become common in the universities and large colleges of the United States. The first medical school in the United States was the Medical College of Philadelphia, organized in 1765, now the medical department of the University of Pennsylvania. The next one was in connection with King's College, now Columbia University, New York. After the Revolutionary War a number of important schools were established, the most noted being the medical school of Harvard and the medical college at Dartmouth. With the increase in population and consequent demand for physicians, the number of medical schools has increased from time to time, until now there are more than 150 in the United States.

At first, the courses of study were elementary and standards for admission were very low. These standards have been gradually raised, until the best medical schools require graduation from college or its equivalent for admission, and a three or four years' course before granting the medical diploma. The medical schools of universities and other large colleges are all open to women, and there is one institution, the Women's Medical College at Philadelphia, devoted entirely to the instruction of women who wish to become physicians.

Medici, *ma'de che*, a Florentine family which rose to wealth and influence by successful commercial ventures and which continued to combine the career of merchants and bankers with the exercise of political power and a liberal patronage of literature and art. The most famous of the family was Lorenzo de' Medici, called the Magnificent (1449-1492). By his munificence he made himself popular with all classes in Florence and attained the position of an absolute ruler. He encouraged learning and the arts in the most liberal manner; he founded academies and had collections made of books and art relics. The popes Leo X, Leo XI and Clement VII, Catharine, the wife of Henry II of France, and Marie, wife of Henry IV of France, were of the Medici family.

Medicine, *med'i sin*, the science which investigates diseases and the art of preventing, healing or alleviating them. It deals with the facts of disease, with the remedies appropriate to various diseases, with the results of accident or injury to the human body, with the causes that affect the origin and spread of diseases and

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with the general laws that regulate the health of individuals and the health of communities. It is broadly divided into two great sections, *surgery* and *medicine* proper. The diseases affecting the outer frame, or those parts of the body visible to the eye, are given to the care of the surgeon, while those that affect the internal organs belong to the province of the physician. There are departments dealing with the diseases of women and children and other departments dealing with the special organs, such as those relating to diseases of the eye, of the ear, of the throat and of the skin. Each department occupies its own domain and is represented by highly trained specialists. The treatment of the insane, as it is concerned with nervous diseases and correlated states of other organs, is an integral part of medical practice. War also has given rise to special developments of medical and surgical science, namely, military hygiene and military surgery; and the administration of the law has created a special branch, medical jurisprudence, or forensic medicine.

At first all diseases were attributed to supernatural causes and the direct influence of unseen beings, and it was believed that they had to be exorcised by ceremonies and prayers. In course of time it was recognized that diseases arose from natural causes; but at the same time each disease was held to be a principle distinct from its effects, and each disease was supposed to have a special remedy—something that would actually cure the disease. Such views led to the adoption of various systems of treatment. For instance, one school held that only vegetable remedies were appropriate to the treatment of diseases; another school upheld the virtues of the bath in one or other of its forms as a universal panacea for all human ills (See HYDROTHERAPY). A third maintained the application of the principle that similars are cured by similars, that is to say, diseases are cured by substances having, in small doses, an action on the body similar to that of the disease, so that one might treat diseases by a series of fixed and specific formulae, all depending on this single principle (See HOMEOPATHY). Finally, there is a strong disposition to attribute success of treatment to particular drugs and to act on the principle that diseases are cured by contraries, that is, by remedies having an action on the body the reverse of that of the disease (See OSTEOPATHY). All these opinions depend on a mistaken view of disease. Anything that interferes with the free and healthy action of any part of the body produces a state of disease, and

the symptoms of the disturbance manifest the disease. For instance, many diseases are caused by the entrance into the body of living germs, which grow and multiply in the blood and tissues and interfere with the various organs. These germs are, however, not the disease, but the cause of the disease (See GERM THEORY OF DISEASE). Again, many diseases are due not to something that has entered the body, but to a breaking down of a certain part of the system. It is clear, therefore, that no specific remedies can be applied to such diseases. The object of the physician is to restore as far as possible the conditions of healthy action, to remove, if he can, the causes of the disease, to relieve pain and to control symptoms so as to direct them toward recovery.

The chief departments of medical science may be given as follows: The science of health is called *hygiene*, or, as far as it relates to the regulation of the diet, *dietetics*. *Pathology* is the science of disease, treating of its nature, origin and progress. *Nosology* treats of the various kinds of diseases, their origin and symptoms, and strives to arrange diseases according to a scientific classification. *Pathological anatomy* deals with the mechanical alterations and changes of structure. *Therapeutics* is the science of the cure of diseases, often divided into *general*, treating of the subject of cure in general, and *special*, of the cures of separate diseases. See DIETETICS; HYGIENE; SURGERY; and numerous articles on special diseases.

Medill', JOSEPH (1823-1899), an American journalist born in New Brunswick, Canada. When eight years old he removed with his parents to Massillon, Ohio. He studied law and was admitted to the bar at Canton in 1846. Three years later he became a journalist and was connected with the management of the *Coshocton Republican*, a Free-Soil paper; the *Cleveland Forest City*, a Whig paper, and the *Free Democrat*, independent. He was actively engaged in the organization of the Republican party in Ohio, and in 1856 with two others he bought the *Chicago Tribune*, which became one of the principal Republican organs of the West. In 1872 he was elected mayor of Chicago, and two years later he became chief proprietor and editor in chief of the *Tribune*, retaining this position until his death.

Medina, a city in Arabia, 248 mi. n. by w. of Mecca. It is a holy city; the mosque of the Prophet, which is the most important

building of the city, contains the tomb of Mohammed. Though the pilgrimage to the tomb is not considered by Mohammedans as an imperative duty, yet it is estimated that one-third of the Mecca pilgrims go on to Medina. None except Mohammedans may enter the city. Population, about 48,000. (See HEGIRA.)

Medina, N. Y., a village of Orleans co., on Oak Orchard Creek and the Erie Canal and on the New York Central & Hudson River railroad, 41 mi. w. of Rochester. The creek furnishes abundant water power, which generates the electricity for the town and serves for industrial purposes. Furniture, pumps, hardware, cigars and vinegar are manufactured. The town was settled about 1830 and was incorporated two years later. Population in 1910, 5683.

Med'iterra'nean Sea, the great inland sea which is almost completely enclosed by Europe, Asia and Africa. Its length is about 2300 miles, its greatest breadth, 1080 miles. It communicates on the west with the Atlantic Ocean by the Strait of Gibraltar, and on the northeast with the Black Sea through the Sea of Marmora, the Dardanelles and the Bosphorus. It is very irregular in shape and is divided by Italy and Sicily into two distinct and not very unequal portions. The important subdivisions are the Adriatic Sea, the Tyrrhenian Sea, the Ionian Sea, the Balearic Sea and the Aegean Sea, or Archipelago. The largest and most important islands are Sicily, Sardinia, Corsica, the Balearic Isles, Cyprus, Crete and Malta. The principal rivers which flow directly into the Mediterranean are the Ebro, the Rhone, the Po and the Nile. Owing to the very narrow channel which connects the Mediterranean with the main ocean, there is very little tide, though on parts of the African coast a rise of more than six feet sometimes occurs. The Mediterranean abounds with fish and also furnishes the finest coral and sponges. It is a great highway of traffic.

Medul'la Oblonga'ta, that portion of the brain which lies below the cerebellum and which forms practically the upper end of the spinal cord. It is pyramidal in shape, about an inch long, and contains a large number of important nerve centers, such as the motor and sensory centers of the cranial nerves and those centers which govern respiration, the action of the heart and many of the functions of digestion, secretion and nutrition. Because of this the medulla oblongata is often called the vital

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knot, a severe injury to this part of the brain resulting in instant death. The medulla is composed of a series of columns which are continuous with the columns of the spinal cord, and it is connected with the cerebellum and the cerebrum by nerve fibers which extend upward to the various brain centers. See BRAIN; CEREBELLUM; CEREBRUM; NERVOUS SYSTEM, subhead *Cerebro-Spinal System*.

Medu'sa, in classical mythology, one of the Gorgons, the only one who was not immortal. In her youth she was a very beautiful maiden, but having boasted to Minerva of her beauty and power, she was turned into a hideous monster, with brazen claws and teeth and serpents for hair. She was killed by Perseus.

Medu'sae, the name given to certain circular, umbrella-shaped jellyfish, which have acquired their name because of the long trailing feelers, that suggest the snakes on the head of Medusa. The tentacles are armed with stinging cells, which in the common medusae of the Atlantic coast are not strong enough to poison bathers, though in tropical waters they are exceedingly annoying. Scientists give the name medusae to the swimming stage in the development of any animal belonging to the Coelenterata.

Meerschäum, *meer'shawm*, a silicate of magnesium, which occurs as a fine, white, compact clay. Its name is a German word meaning *sea foam* and was applied to this substance because early specimens were found on the seashore in round, white masses, resembling petrified sea foam. It is found in Europe, but is more abundant in Asia Minor. It is manufactured into tobacco pipes.

Meg'aphone. See SPEAKING TRUMPET.

Meg'atherium, a genus of extinct mammals. They were allied to the sloths, but had feet adapted for walking on the ground. Their remains are found in the upper Tertiary or pampas deposits of South America. The megatherium was about eight feet high and from twelve to eighteen feet long. Its fore feet, about a yard in length and armed with gigantic claws, show that roots constituted its chief food.

Mehemet Ali, *ma'he met ah'le*, (1769-1849), viceroy of Egypt. He entered the Turkish army, became successively pasha of Cairo, of Alexandria and of all Egypt. In order to put down a revolt of the Mamelukes, he massacred them in great numbers. He then commenced, by the orders of the porte, a war of

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six years' duration in Arabia, which was brought to a successful conclusion by his son Ibrahim. From 1824 to 1827 he assisted the sultan in endeavoring to reduce the Morea, which led to the destruction of his fleet by the allied European powers at Navarino. Subsequently he turned his arms against the sultan, and in his efforts to secure dominion over Syria by armed invasion, he was so far successful that the European powers had to interfere and compel him to sign a treaty which gave him the hereditary pashalic of Egypt, but compelled his submission to the Turkish government.

Mei-nam, *ma nah'm*'. See ME-NAM.

Meissonier, *ma so nyay'*. JEAN LOUIS ERNEST (1815-1891), a French painter of historical subjects, born in Lyons. He first became known as an illustrator of books, but rapidly became famous for the singular perfection of his art. His pictures, which are almost without exception upon a small scale, are characterized by great minuteness of execution and by high finish, but are at the same time not less remarkable for their excellence in composition and breadth of treatment. His pictures have been sold for enormous sums. Among them are *The Smoker*, *Napoleon III at Solferino*, *The Cavalry Charge* and the picture entitled "1807."

Meistersingers, *mise'tur sing'urz*. See MASTERSINGERS.

Mek'ka. See MECCA.

Mekong, *ma kong'*, **River** or **Cambo'dia River**, a large river of southeastern Asia, which rises in Tibet, flows through part of China, Siam, Cambodia and French Cochinchina, and enters the Chinese Sea by several mouths. Its length is about 2600 miles, but it is navigable for large vessels for only about 200 miles from its mouth.

Melancholia, *mel'an ko'le ah*. See INSANITY.

Melanchthon, *ma lank' thon*, PHILIP (1497-1560), a German reformer, born at Bretten, in Baden. While professor of Greek at Wittenberg, he met Luther, with whom he became associated in the work of spreading the new religious movement (See LUTHER, MARTIN; REFORMATION). Melanchthon was quiet and studious, quite the opposite of Luther, and often influenced the latter to adopt more moderate views. Because of his mild disposition, Melanchthon was able to settle peaceably many differences between the Protestants and the Catholics and to do much for the cause of the Reformation. He is the author of the *Augs-*

burg Confession, which is the standard of faith for the Lutheran Church, although much altered at the present time. His works include a Greek and Latin grammar, biblical commentaries, theological and ethical works.

Mel'ba, NELLIE (1865-), an Australian soprano vocalist. She was educated in Europe and made her debut at Brussels in 1887. Her first appearance in America was at New York in 1893, as "Lucia," and her remarkably clear, rich and sympathetic voice won immediate recognition. After that time she was considered in the front rank of operatic sopranos.

Melbourne, *mel'burn*, a city of Australia, capital of Victoria, on the Yarra, about 8 mi. from its mouth. It occupies an extensive area, which is mostly hilly and undulating, with the Yarra winding through it. The principal streets are wide and well paved and are lined with handsome and substantial edifices. Among the most noteworthy of the public buildings are the houses of parliament, the treasury, the law courts, the free library, the mint, the university and the theaters. There are several public parks, a finely laid-out botanical garden and a splendid race course. The shipping trade is large, and Melbourne is the most important commercial town of the Southern Hemisphere. The chief exports are gold, wool, hides and leather, cereals and flour, and the chief imports are manufactured goods. Most imports are subject to a heavy duty. By its railway systems, Melbourne is connected with all the principal towns of the Australian continent. Melbourne was founded and named in 1837 and was incorporated in 1842. A Centennial International Exhibition was held there in 1888, in celebration of the founding, in 1788, of the Australian colonies. Population of the city proper in 1911, 140,000; inclusive of suburbs, 591,830.

Melbourne, WILLIAM LAMB, Viscount (1779-1848), an English statesman. He succeeded to the premiership in July, 1834, was dismissed in November, but was recalled in the following year. When Queen Victoria came to the throne, it was Melbourne to whom she looked for instruction as to her duties. From 1841 to his death Melbourne took little part in public life.

Meleager, *mel'e a'jur*, in Greek mythology, a hero distinguished for his part in the Argonautic expedition, and particularly for his share in the Calydonian hunt. He killed the boar and gave its skin as the highest token of regard to his beloved Atalanta.

Mel'ilot, the common name of a group of plants belonging to the Pulse family, also called sweet clover. These plants resemble alfalfa, having three-lobed leaves and small white or yellow flowers. They have a sweet odor, especially when drying. The yellow melilot grows to a height of three or four feet and is found in damp places. The flowers are used in the manufacture of perfume. This has become a troublesome weed in some districts, owing to its great abundance in pasture land. Increased cultivation of the soil and fertilization will usually prevent its spread.

Mel'len, CHARLES SANGER (1851-), an American capitalist and railway manager, born at Lowell, Mass. He entered the service of railways in 1869, rising gradually until he became general traffic manager of the Union Pacific system in 1889. Three years later he was made general manager of the New York & New England railroad, later president of the Northern Pacific railway and in 1903 president of the New Haven & Hartford railroad company. In 1910 he also became president of the Boston & Maine railroad company. He resigned from both positions in 1913.

Melodrama, *mel o drah'ma*, originally and strictly, that species of drama in which the declamation of certain passages is interrupted by music. The term has now come to designate a romantic play, generally of a serious character, in which effect is sought by startling incidents, striking situations and exaggerated sentiment, aided often by splendid decoration and music.

Melody, in the most general sense of the word, any succession or series of tones; in a narrower sense, a series of tones which please the ear by their succession and variety; in a still narrower sense, the predominant air or tune of a musical piece.

Mel'on, a well-known fruit of a climbing or trailing annual plant. There are numerous varieties cultivated in all parts of the world. *Muskmelon* (often heard as *mushmelon*), *cantaloupe* and *nutmeg* are names given to different varieties that have been produced by cultivation from one species whose origin no one knows with any certainty. In England the word melon is confined exclusively to this one fruit, but in the United States the word is as frequently applied to the fruit of a very different vine, known as the *watermelon*, which grows in most warm countries and in several states is a large and important crop.

Melos

Me'los or **Mi'lo**, an island belonging to Greece, in the Grecian Archipelago, in the southeastern part of the Gulf of Aegina. It is one of the Cyclades, and its area is about 60 square miles. Near the site of the ancient town of Melos is a modern town, Plaka. In 1820 a peasant discovered on the island of Melos the celebrated Venus of Milo, which is now in the Louvre, Paris. Population of the island, 5310.

Melpom'ene, the muse who presides over tragedy. She is generally represented as a young woman, wreathed with vine leaves and holding in her hand a tragic mask.

Mel'rose, **MASS.**, a city in Middlesex co., 7 mi. n. of Boston, on the Boston & Maine railroad. It is a residence suburb of Boston and also contains manufactures of rubber boots and shoes and other articles. The city has a free library and a public park. Other features of interest are the Middlesex Fells, a state reservation of 1800 acres, and Spot Pond, a large national reservoir. The place was settled about 1632, was made a separate municipality in 1650 and was chartered as a city in 1900. Population in 1910, 15,715.

Mel'ville Island, an island in the Polar Sea, north of America. Captain Parry discovered it in 1819.

Melville Peninsula, a peninsula of the northern coast of North America, n. of Hudson Bay. It forms part of the Canadian territory of Keewatin. Boothia Gulf bounds it on the west, Fury and Hecla Strait on the north, and Fox Channel on the east.

Membranes, *mem'braynz*, those tissues of the body which are arranged in layers. They are found covering organs, forming the walls of tubes and lining cavities. The principal classes are *serous*, *mucous* and *fibrous*. Serous membranes, as the pleura, pericardium and peritoneum, form a sort of closed sac surrounding certain organs and secrete a small quantity of serous fluid, which allows free action to the organs. These membranes are liable to various diseases, as inflammation, diseased growths and hemorrhage. Serous membranes which line the cavities of joints and the sheaths of tendons and ligaments are called synovial membranes. Mucous membranes line all cavities by which matter is taken into the body or expelled from it, as well as all that communicate with the external air, as the digestive apparatus and air passages. These membranes have a soft, velvety surface and secrete such a fluid as best

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serves the organs they line. Fibrous membranes include the periosteum, covering the bones, the dura mater, covering the spinal cord and brain, and the membrane found in many glands.

Memel, *ma'mel*. See NIEMEN.

Mem'ling, **HANS** (1430?-1494), one of the greatest of early Flemish painters. In his study he became a pupil of Van der Weyden, whom he surpassed. The figures of women in his pictures are especially attractive and are noted for the beauty and refinement of their faces. He is also noted for the detail and accuracy of his drawings. Many of his paintings are in Bruges, where he lived. His *Virgin and Infant Jesus* and *Marriage of Saint Catherine* are in the Louvre, Paris. Other works are *The Madonna and Infant Christ Enthroned*, *Saint Lawrence* and *Saint John the Baptist*, and *Saint Christopher and the Infant Christ*.

Memminger, *mem'min jur*, **CHRISTOPHER GUSTAVUS** (1803-1888), an American politician, born in Württemberg, Germany. He was taken in infancy to South Carolina, where he was placed temporarily in an orphan asylum, but he was later adopted into the family of a wealthy and influential planter. He graduated from South Carolina College in 1820, studied law and began practice in Charleston. He was elected many times to the state legislature and always vigorously opposed John C. Calhoun. After the election of Lincoln he was prominent in the secession movement in South Carolina and became secretary of the treasury in the newly formed Confederacy. He resigned in June, 1864.

Mem'non, a king of the Ethiopians, mentioned in the Homeric poems as coming to the aid of Troy against the Greeks. He slew Antilochus, but was himself slain by Achilles. The name of Memnon was latterly given to a statue still standing at Thebes, in Egypt, which was one of two known from their size as the *Colossi*. This statue, known as "the vocal Memnon," was celebrated in antiquity as emitting a sound every morning at the rising of the sun.

Memo'rial Day. See DECORATION DAY.

Mem'ory, the power of mind by which we retain, recall and re-know mental experiences. A complete act of memory has three phases, usually known as retention, recollection and recognition. If any one of these is missing, the act is of little or no value. Memory is the result of a fundamental law of the nervous system, namely, a tendency of the nerves to act

again in the manner in which they have already acted (See HABIT). Memory is not a distinct intellectual power, with a special site or special center in the brain, as formerly supposed. It has a physical as well as an intellectual basis, and as many centers as there are avenues of knowledge. Each sense, each mental power, each train of thought and feeling has its memory.

LAWS OF MEMORY. Ideas in the mind are recalled to consciousness according to two methods of association, namely, by contiguity, or simultaneity, and by similarity. See ASSOCIATION OF IDEAS.

The Law of Contiguity. According to this law, ideas are recalled according to their association in time and place. Ideas which accompany each other in close succession are usually reproduced in the order of their occurrence. A child soon learns that fire is accompanied by heat, and the idea of one will recall the idea of the other. The idea of a part suggests the idea of the whole, as a boiler suggests an engine; a wheel, a wagon; a leaf, a tree. The order of sequence is important under this law. We recall with less effort those ideas which occur in the order of logical connection or in the order in which we are accustomed to associate them. One will recall the letters in the alphabet in the order of a, b, c, with little or no effort, but if he attempts to recall them in any other order, a serious effort is necessary. This law of memory closely associates memory with reason and embodies the relation of cause to effect, as lightning suggests thunder; a tree in blossom, the fruit. Conversely, effects suggest causes, as the eating of the fruit may suggest the tree in blossom.

Law of Similarity. According to this law, similar ideas tend to recall each other. A stranger may recall a friend because he resembles him in appearance. One river recalls another; one journey, another, and so on. The law of similarity has a less extensive application than the law of contiguity; yet it is important, because it enables many ideas to be reproduced which cannot be recalled by the law of contiguity. Ideas reproduced by similarity do not necessarily occur simultaneously in time and place.

The primary laws of memory are modified by so-called secondary laws. The most important of these are:

Clearness of Knowledge. Ideas cannot be reproduced unless they are retained, and it naturally follows that one recalls more readily

the ideas which he has most completely apprehended. Therefore, every possible power of the mind should be brought to bear upon the acquisition of a new idea.

Repetition. Other things being equal, those ideas which are most frequently present in consciousness are the most readily recalled. Repetition tends to strengthen the idea and also to establish the habit of its recall.

Degree of Feeling. The feeling attending the experience of an idea may be either pleasurable or painful, and the greater the degree of this feeling the more easily is the subject recalled. Some ideas are acquired under conditions which give rise to very strong emotions and are recalled with an extraordinary degree of vividness. Severe accidents, great calamities, the death of a friend, are ideas of this sort.

Interest. Interest is a strong factor in determining the association of ideas, and a person most readily recalls those experiences which have the most significance to him or which he feels appeal most vitally to his needs. See INTEREST.

Inherent Mental Tendencies. Some are naturally interested in one subject, and others in another. For this reason two people viewing the same scene will obtain different mental pictures of it and consequently recall different images. These tendencies begin to appear early in life, and unless carefully guarded they are liable to lead to one-sided development.

KINDS OF MEMORY. Psychologists frequently recognize two kinds of memory, based upon the two primary laws of association. The memory based upon the law of contiguity is usually known as a logical, or thinking, memory. The careful culture of this memory leads one to associate cause and effect and to depend more upon his powers of reasoning and judgment for arriving at conclusions than upon his ability to recall ideas mechanically. The memory based upon the law of similarity is more of a mechanical memory and tends to arrange ideas in series and then recall them in a certain order, whether or not this order is logical. Many illustrations of this sort of memory are found among school children, such as committing the multiplication table, regardless of the process by which the results are obtained; the memorizing of the rules in arithmetic, grammar and other subjects without a knowledge of their meaning or ability to apply them. Because the mechanical memory is abused, it is often considered an evil, yet it is necessary to the complete development of the memory, and when

properly guarded it is a source of mental strength.

CULTIVATION OF MEMORY. Memory is one of the most important of the mental powers. Without it, it would be impossible to retain knowledge and one would be unable to profit by his experiences. Memory develops early in life, and through childhood and youth it should receive careful attention. Its cultivation can be assisted by adhering to the following principles:

(1) Memory depends upon sensation, perception and thinking. Unless these powers are properly developed, memory will be defective. See **SENSATION; PERCEPTION; CONCEPT.**

(2) The order of the processes in the acquisition of an idea is as follows: (a) Observation; (b) thought (forming concepts); (c) application. In cultivating the memory, these three phases of its use should be carefully considered. Like every other power, memory is strengthened by use, and unless children are required to reproduce their ideas they never form the habit of doing this easily and correctly.

(3) Memorizing selections may be either beneficial or injurious, according to the method employed. If the law of acquisition of ideas is followed and the child understands what is memorized, such exercises are beneficial in strengthening the memory, but if to any extent he is allowed to memorize meaningless words or words which he cannot properly understand and pronounce, he soon acquires the habit of doing this work carelessly and is unable to recall the ideas correctly.

(4) Habits of reading become means of weakening or strengthening the memory. When one reads without thought, the effect upon the memory is injurious; but if he reads thoughtfully, with the purpose of retaining the ideas, and then follows the reading by the reproduction of those ideas, the memory is strengthened. For this reason requiring children to reproduce their exercises in school, either orally or in writing, is a valuable training.

(5) All school subjects are valuable for memory training, but arithmetic, literature, history and drawing, when properly taught, are the best, because they appeal to the powers of observation and to the thought power.

(6) Memory is aided by repetition. If the repetition is so planned that the mental process is not different from the original act of learning, it is a great aid to the memory. Teachers in planning reviews should bear this principle in mind. The review should enable the pupils to

recall the subjects in the order in which the different topics were learned, and it should never contain more than the mind can grasp and hold at one time.

(7) The memory image, however vivid, is always fainter than the original; therefore, care should be taken to see that the child obtains as clear and complete ideas as possible. See **PERCEPTION.**

(8) Childhood is the age for developing and strengthening the memory. During the school life of the child it is well for him to memorize some things which he does not fully understand, because as the reasoning powers develop and he extends his field of knowledge, these subjects will be fully apprehended.

(9) The mechanical memory is essential to the child and in some cases to the adult. The danger in its use lies in the liability to rely upon it after the logical memory should take its place.

See **PSYCHOLOGY; METHODS OF TEACHING.** Consult Dorpfield's *Thought and Memory*; Halleck's *Psychology and Psychic Culture*, and Salisbury's *The Theory of Teaching.*

Memphis, mem'fis, an ancient city of Egypt, on the west bank of the Nile, about 12 mi. s. by w. of Cairo. It is said to have been founded by Menes, the first king of Egypt. It was a large and splendid city and after the fall of Thebes was the capital of Egypt. The pyramids and tombs of Sakkara and the colossal statue of Rameses II are the chief objects of interest on the site.

Memphis, TENN., the county-seat of Shelby co., on the Mississippi River, 209 mi. w. s. w. of Nashville, on the Illinois Central, the Louisville & Nashville, the Chicago, Rock Island & Pacific, the Southern and several other railroads. It is situated on a bluff 40 feet above high water. Among the principal buildings are the United States customhouse, the Cotton Exchange, Cossitt Library, Memphis Hospital Medical College, Lyceum theater, the Grand Opera House, the Auditorium, the county building, City Hall and High School. The city contains a marine hospital and several other large hospitals, and among its educational institutions are the West Tennessee Normal School, Christian Brothers' College, Hannibal Medical College, and Le Moynes Normal Institute. Memphis has several beautiful parks, containing, all told, more than 1000 acres. Its streets are shaded and well paved and are lined with beautiful homes and substantial business blocks, which emphasize the city's prosperity and prog-

ress. The facilities for transportation and the excellent location of Memphis have made it one of the chief commercial cities of the South. It is the most important cotton market in the interior of the United States. Its cottonseed oil industry is also important, as well as the trade in groceries, dry goods, shoes, hardware and agricultural implements. There are immense wood-working establishments, large foundries, machine shops, furniture factories, flour mills, clothing factories, brick and tile plants and tobacco factories. The Mississippi River is crossed here by a magnificent iron bridge, built in 1892. The first settlement in Memphis was made in 1819. In 1826 it was incorporated as a town, and in 1849 it was chartered as a city. Population in 1910, 131,105.

Memphremagog, *mem'fre ma'gog*, a lake which is situated partly in Vermont and partly in the Province of Quebec, Canada. Its length is about 35 miles, its width from 2 to 5 miles. Its waters are discharged through the Magog River into the Saint Francis River in Canada. The lake, on account of its picturesque scenery, is much visited by tourists, and many beautiful summer resorts are located on its banks.

Menai, *men'i*, **Strait**, the channel between the island of Anglesey and the mainland of Wales. It is about 13 miles long and its width varies from one-fourth of a mile to two miles. The navigation of the strait is extremely difficult. The strait is spanned by a suspension bridge and by the Britannia tubular bridge.

Menam, *ma nahm'*, or **Mei-Nam**, the chief river of Siam. It rises in the Shan Mountains, flows in a generally southern direction and enters the Gulf of Siam below Bangkok. Its length is about 750 miles, but it is navigable by large vessels only as far as Bangkok.

Menash'a, Wis., a city in Winnebago co., 88 mi. n. by w. of Milwaukee, on Lake Winnebago at its outlet into the Fox River, on the canal between the Fox and Wisconsin rivers and on the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul and the Wisconsin Central railroads. Like other places on the lake, it is a popular summer resort. It has a public library and contains woodenware mills, paper mills, machine shops, flour, lumber and woolen mills, brickyards and other establishments. The place was settled in 1847 and was incorporated in 1874. Population in 1910, 6081.

Mendelssohn-Bartholdy, *men'del sone bahr-tole'dy*, FELIX (1809-1847), a distinguished

composer, born at Hamburg. In his ninth year he publicly appeared in Berlin, and in his sixteenth year he produced the well-known overture to the *Midsummer Night's Dream*. In 1829 he began an extensive tour through England, Scotland, France and Italy, and on his return to Germany he became musical director in Düsseldorf. In 1835 he was chosen conductor of the famous concerts in the Gewandhaus of Leipzig and later received several royal appointments, which made the last years of his brief life a continuous triumph. His works are delicate and melodious, but somewhat superficial. The best are *Songs Without Words*, the oratorios *Saint Paul* and *Elijah*, the *Midsummer Night's Dream* overture and the cantata to Goethe's *First Walpurgis Night*.

Men'ela'us, in Greek mythology, the brother of Agamemnon and husband of the beautiful Helen, with whom he received the kingdom of Sparta. His wife was carried off by Paris, son of Priam, king of Troy, and in accordance with a previous oath, the Greek princes joined Menelaus in his effort to avenge the affront. Menelaus himself led sixty ships to the siege of Troy. After its conquest he returned with Helen to his native land in a devious voyage which led him to Cypria, Phoenicia, Egypt and Libya, and thereafter he ruled happily until his death. See HELEN.

Menha'den or **Mossbunker**, an American salt-water fish of the herring family. It abounds on the shores of New England, where it is taken in large quantities and used for fertilizer and as the source of a valuable oil. Since a method for extracting the bones has been discovered, the menhaden has become a valuable food fish and is preserved in the same way as sardines. This remarkable fish is known in different localities by different names; *pogy*, *whitefish*, *bunker*, *fat-back*, *yellow-tail* and *bony fish* are but a few of them.

Meningi'tis, inflammation of the membranes of the brain and spinal cord. It is frequently a result of some other disease or of an accident, but a form known as cerebro-spinal meningitis is fairly common as an epidemic. The symptoms are headache, vomiting, pain and stiffness in the neck, and sometimes delirium or convulsions. Occasionally, in the more acute forms, death results within a day or two, but the mortality in the less severe type ranges from 30 to 70 per cent.

Men'nonites, THE, a Protestant sect, founded

at Zurich in 1525. The doctrines spread rapidly through Switzerland, Germany and Austria. As a result of persecution, three thousand perished and many went to Moravia and Holland. Menno Simons (1492-1561), a native of East Friesland, gave the society its name through his efforts to unite the sects into which it had broken up. In the latter part of the seventeenth century a number of Mennonites emigrated to America, and settled at Germantown, Pa. They were the first people in the United States to protest against slavery. In 1871 many more came to the United States from Russia, to avoid conscription for the army of the Czar, and settled in Minnesota and Kansas. These people refuse to take oaths and to bear arms. They pay much attention to the ordering of their lives on Christian principles and are cultured, honest and charitable. A total of 60,000 members in the United States and 20,000 in Canada is reported.

Menom'inee (wild rice men), a tribe of indians once occupying northern Wisconsin. Of the remnant, about 1400 now live on a reservation near Green Bay.

Menominee, MICH., the county-seat of Menominee co., 52 mi. n. e. of Green Bay, Wis., on Green Bay at the mouth of the Menominee River, opposite Marinette, Wis., and on the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul and other railroads. The city is a great lumber-shipping port, contains many saw and planing mills and manufactures electrical apparatus, shoes, paper, boilers, machinery and other articles. It has a public library, Saint Joseph's Hospital and a fine high school building. The place was first settled in 1799. Population in 1910 10,507.

Menom'onie, WIS., the county-seat of Dunn co., situated on the Red Cedar River and on the Chicago, Milwaukee & Saint Paul and the Chicago, Saint Paul, Minneapolis & Omaha railroads, 25 mi. n. w. of Eau Claire and 70 mi. e. of Saint Paul. Its industries consist of large lumber and shingle mills, foundries, machine shops and brickyards. The city is noted for its educational advantages, being the seat of the Stout Training School for the preparation of kindergartners, teachers of manual training and domestic science; also of a county training school which prepares teachers for county schools, and a county school of agriculture and domestic economy. Its public schools give instruction in art, manual training and domestic science in all grades in which the various branches

of the work can be taken with profit. Population in 1910, 5036.

Men'sura'tion, the application of the simpler processes of mathematics to the measurements of lines, surfaces and volumes. Length must be measured by direct comparison with some unit of length. But the area of surfaces may be found without such direct comparison, the number of units of area being equal to the product of the numbers of corresponding units of length in each of the two dimensions of the surface. The area of any parallelogram is equal to the product of the number of units of length in its altitude by the number of units of length in its base. The area of any irregular polygon may be found by dividing it into triangles, the area of each triangle being equal to one-half the product of the number of linear units in its base by the number of linear units in its altitude. The area of a trapezium is equal to half the sum of two opposite sides multiplied by the perpendicular distance between them. The circumference of a circle may be found by multiplying the diameter by π or 3.14159. The area of a circle may be found by multiplying the square of its radius by π or multiplying the radius by one-half the circumference. The volume of any rectangular solid may be found by multiplying the length, width and depth together; that of a cylinder, by multiplying the height by the area of the base; of a cone, by multiplying the height by one-third the area of the base; of a sphere, by multiplying the cube of the radius by $\frac{4}{3}\pi$.

Men'tor, the faithful friend of Ulysses, to whom Ulysses entrusted the care of his domestic affairs during his absence in the war against Troy. The education of the young Telemachus fell to his charge, and the wise and prudent counsel which he gave the youth has made his name the synonym for a wise counselor. See ULYSSES.

Mephistopheles, *mef'is tof'e leez*, the name of a demon in the old puppet plays, adopted by Goethe in the first part of *Faust*. Although the name since Goethe's time has been commonly used as a name for the devil, the Mephistopheles of Goethe has few of the characteristics which, in the ordinary belief, belong to Satan.

Merca'tor, GERAARD (1512-1594), a Flemish geographer, born at Rupelmonde, in Flanders. He is the author of a method of projection used in nautical maps, the principles of which were applied practically by Edward Wright in 1599. He is also the author of *Tabulae Geographicae*.

Merca'tor's Projec'tion. See MAP.

Mercer, *mur'sur*, HUGH (1720-1777), an American soldier, born at Aberdeen, Scotland. He served as surgeon in the forces of the pretender Charles Edward in 1745, and at the failure of the rebellion he went to America, settling near the site of the present Mercersburg, Pa. At the outbreak of the Revolution he joined the patriot party and became brigadier general in 1776. He fought with distinction at Trenton and at Princeton, where he was mortally wounded. At Laurel Hill Cemetery, Philadelphia, there is a monument to him.

Merchant Marine, *mur'chant ma reen'*, a collective name for the commercial fleets or shipping of any nation or of the world. Throughout all antiquity and during medieval times, the Mediterranean Sea was the scene of the world's commerce, and the most prominent trading centers were successively Phoenicia, Carthage and Venice. The Belgian cities of Bruges and Antwerp and the German cities of the Hanseatic League controlled the carrying trade of northern Europe until the discoveries and explorations of the fifteenth century brought the Portuguese, Spanish, English, Dutch and French into hearty rivalry with them. In the end, England out-distanced her competitors and has since held the most prominent position in Europe. At the time of the breaking out of the Civil War, the ships of the United States controlled almost as much trade as Great Britain herself, but the war threw our commerce back to such an extent that it has never again reached the same relative importance, although for a number of years it has been rapidly improving. The coastwise trade of the United States is nearly seven times as large as its foreign trade. The position of the merchant marine of the United States is shown by the fact that in the year 1910 the tonnage of Great Britain was fully 18,000,000, while that of the United States was a little more than 5,500,000. The tonnage of Germany was nearly 4,000,000; of Norway, 1,750,000; of France practically the same, while that of Italy was a little over 1,000,000. For the year ending June, 1910, the United States vessels entered at domestic ports had a carrying capacity of about 7,000,000 tons, while the capacity of foreign shipping in our ports amounted to 24,000,000 tons. There were in the world in 1903 about 30,000 ships exceeding 100 tons in capacity, but of these the United States had only about 3400 ships, aggregating less than 4,000,000 tons.

Mercier, *mair'sya'*, HONORÉ (1840-1894), a Canadian politician, born at Saint Athanase, Quebec. He was educated at Jesuits' College, Montreal, and studied law, but engaged in journalism. He sat in the Dominion parliament from 1872 till 1874, became solicitor general, was a member of the legislative assembly of Quebec in 1879 and became attorney-general and premier in 1887, at the head of a coalition of Liberals and Clericals.

Mercury, *mur'ku ry*, or **Quick'silver**, a metal, heavier than any other excepting the platinum metals, gold and tungsten, and the only metal which is liquid at ordinary temperatures. At 39° or 40° below the zero of Fahrenheit, it freezes, and under a heat of 660° it rises in fumes and is gradually converted into a red oxide. Mercury is prepared principally from cinnabar (red sulphide of mercury) by heating, combined with condensation of the vapors. Mercury in its metallic form, as well as in its salts, is poisonous, and chronic poisoning is apt to afflict persons who work continuously about the metal. Because of the extensive range between its freezing and its boiling point and because of its fluidity, it is well adapted for use in barometers and thermometers, which allow for its expansibility under heat. Preparations of this metal are among the most powerful poisons and are extensively used as medicine (See CALOMEL; CORROSIVE SUBLIMATE). In its fluid state, mercury combines readily with most of the metals, to which it imparts a degree of fusibility or softness. This quality of combination makes it a useful factor in methods of extracting metals from their ores. An alloy of mercury and any other metal is called an amalgam. Mercury is sometimes found in its fluid state, but usually it occurs as the sulphide. About one-third of the mercury used in the world comes from Spain, but it is also found in Germany, Italy, China, Borneo, Mexico and Peru. California, Texas and Oregon produce some mercury, the largest supply coming from California.

Mercury, the planet nearest the sun and the smallest of the major planets. Its diameter is about 3000 miles, which makes the planet about three times the size of the moon. Mercury moves round the sun in a little less than 88 of our mean solar days, at a mean distance of about 35,392,000 miles. At its nearest approach to the sun it is about 29,000,000 miles away, and at its farthest point, more than 43,000,000

Mercury

miles from it. The period of its axial rotation is said to be 24 hours, 5 minutes and 28 seconds. Its volume is about one-seventeenth that of the earth, and its density is one-tenth greater than that of the earth. When farthest east of the sun, it is visible to the naked eye in spring and autumn, after sunset and before sunrise. Mercury is a difficult planet for astronomers to study, and very little is known concerning it. At intervals of from three to thirteen years it is seen to pass across the sun's disk, and this transit is always studied very carefully, for it shows clearly the laws that govern the planet's motion. Nov. 17, 1907, and Nov. 14, 1914, are dates when the transit is visible in Europe and the Eastern United States.

Mercury, in Roman mythology, the son of Jupiter and Maia, and the messenger of the gods; in Greek mythology he is called Hermes. When he was but a few hours old he sprang from the knees of his mother, seized a tortoise shell and stretched strings across it, thus inventing the lyre. Before night he had stolen the oxen of Admetus, which Apollo was tending, and had hidden them so securely that Apollo could not find them. Mercury was obliged to confess where he had concealed the animals, and in return for the two which he had eaten he gave to Apollo his newly invented lyre. Apollo, pleased with the gift, presented Mercury with the caduceus, which became his most characteristic symbol. Jupiter also presented him with a winged cap, winged sandals and a short sword, by means of which he could make himself invisible and could transport himself to any place in the twinkling of an eye. One of Mercury's duties was to conduct the souls of the dead to Hades. He was also the god of commerce and of eloquence.

Mercy, **SISTERS OF**, the name given to members of female religious communities founded

Merida

for the purpose of nursing the sick at their own homes, visiting prisoners, superintending the education of females and performing similar acts of charity and mercy. Communities of Sisters of Mercy are now widely distributed over America and Europe.

Mer de Glace, *mair de glas*, the name of the most celebrated glacier of the Alps. It is situated on the northern slope of Mount Blanc and has an area of sixteen square miles and a length of about nine miles. The lower end is known as the Glacier des Blois, whence it flows into the Arveyron River, in the valley of Chamonix. This glacier is easily accessible from the village of Chamonix, and consequently is visited by a large number of tourists each season. During the summer and autumn its flow has an average of two feet a day. See **GLACIERS**.

Mer'edith, **GEORGE** (1828-1909), an English poet and novelist. He was born in Hampshire and was educated in Germany. After studying law for a time, he turned to literature, and his first venture was a volume of poems, published in 1851. His first novel, *The Ordeal of Richard Feverel*, was published in 1859, and from that date poems and novels appeared steadily, although not rapidly. Among the works which marked Meredith as one of the foremost novelists of the late nineteenth century are *Rhoda Fleming*, *The Adventures of Harry Richmond*, *The Egoist*, *Diana of the Crossways*, and *The Amazing Marriage*.

Mergan'ser, a family of fish ducks with slender, straight bills, hooked at the tip and notched at the edges. The *hooded merganser* is suitable for food, but the flesh of most of the others is strong, because of their proclivity for eating fish. The *red-breasted merganser* is about two feet long and has no crest. Together with the hooded merganser it is found in nearly all parts of the northern hemisphere.

Merida, *ma're da*, the capital of Yucatan, in Mexico, 26 mi. from the port of Progreso, on the Mexican Gulf, with which it is connected by a railway. It has a Moorish aspect and contains a number of fine squares, a cathedral, a bishop's palace, a government house and good legislative buildings. Population in 1910, 61,999.

Merida, a town of Venezuela, capital of the State of the same name. It was once the largest city of Venezuela, but it was destroyed by an earthquake in 1812 and has been only partly rebuilt. It is, however, a flourishing town, with a university and manufactures of various articles. Population, about 12,000.



MERCURY
From the bronze statue by
John of Bologna

Mer'iden, CONN., a city in New Haven co., halfway between New Haven and Hartford, on two lines of the New York, New Haven & Hartford railroad. It is a prosperous industrial center and has a picturesque location in an agricultural district, not far from the beautiful Lake Merimere. There are extensive manufactures of silver and plated ware, hardware, cutlery, organs, piano-playing attachments, glassware, machinery and various other articles. The city contains the Curtis Library, Connecticut School for Boys, Curtis Home for Orphan Children and Aged Women and Meriden Hospital. Previous to its incorporation as a town in 1806, it was a part of Wallingford. It was chartered as a city in 1867. Population in 1910, 27,265.

Merid'ian, one of the innumerable imaginary lines passing from pole to pole perpendicular to the equator, on the surface of the earth. They serve to determine the longitude of places and thus to mark their exact position. Every place on the globe has its meridian, and when the sun arrives at this line it is noon, or midday. The longitude of a place is its distance—usually stated in degrees, minutes and seconds—east or west of any meridian selected as a starting point, just as its latitude is its distance north or south of the equator. At a national conference held at Washington, October, 1884, Greenwich was selected as the geographical and astronomical reference meridian of the world, longitude to be reckoned east and west from this, up to 180°. See **LONGITUDE**.

Meridian, MISS., the county-seat of Lauderdale co., 85 mi. e. of Jackson, on the Mobile & Ohio, the Queen & Crescent and the Southern railroads. The city is in a cotton-growing region and has an extensive trade. It contains railroad shops, cotton, cottonseed oil and lumber mills, ice factories and various other works. Here are located the East Mississippi Female College, the Meridian Academy and the Lincoln School. The city was an important supply depot during the Civil War. In 1864 General Sherman destroyed all the railroads in the vicinity and many of the storehouses and residences in the city. Population in 1910, 23,285.

Merimee, *ma re ma'*, PROSPER (1803-1870), a French novelist, dramatist and historian. He filled, in succession, various positions under the French government, was elected to the French Academy and was made commander of the Legion of Honor. Several reports of his researches as inspector of ancient monuments were among his early work; but he is chiefly

known for his *Colomba*, a tale of a Corsican vendetta; *Carmen*, a romance which was the origin of Bizet's popular opera, and several volumes of short stories.

Merino, *mer e'no*. See **SHEEP**.

Merle d'Aubigne, *mairl do be nya'*, JEAN HENRI (1794-1872), a Swiss historian and theologian. His education, begun at Geneva, was completed at Berlin; he became pastor at Hamburg to a French congregation and removed afterward to Brussels. Returning to Geneva in 1831, he became professor of Church history in the theological school founded by the Genevan Evangelical Society. Besides his well-known *History of the Reformation in the Sixteenth Century*, he published a supplementary history to the time of Calvin; *The Protector* (Cromwell), and the *Recollections of a Swiss Minister*.

Merlin, *mur'lin*, a famous ancient British magician and prophet, who, according to Geoffrey of Monmouth, lived in the fifth century. Accounts of him are bound up with the legends about King Arthur, and one of Tennyson's *Idylls of the King* deals with him.

Mer'maid and Mer'man, legendary creatures who lived in the sea, possessed human bodies united to the tails of fishes and were supposed to be capable of entering into social relationships with men and women. The typical mermaid was a lovely creature who combed her long, beautiful hair with one hand while she held a looking-glass with the other. The origin of this myth is supposed to rest in the human-like appearance of certain aquatic animals, such as the seal. The legends of mermaids and mermen have been largely treated in poetry.

Merovingians, *mer o vin'je anz*, the name given to the first dynasty of Frankish kings who ruled in Gaul. The grandfather of Clovis, Merovaeus, is supposed to have given his name to the line. Clovis, the first powerful king of the dynasty, was succeeded by weaker kings, and the royal power came in time to be a name only, the real authority being possessed by the mayors of the palace. Childeric III was deposed in 752 by Pippin the Short, who was the founder of the Carolingian dynasty. See **CAROLINGIANS**.

Mer'ril, WIS., the county-seat of Lincoln co., 170 mi. n. w. of Milwaukee, on the Wisconsin River and on the Chicago, Milwaukee & Saint Paul railroad. The city is in a hard wood lumber district, and lumbering and the manufacturing of lumber products are the principal industries. It contains the Scott Public Library, a large opera house and a fine

courthouse. The place was settled in 1875 and was incorporated in 1880. Population in 1910, 8689.

Mer'rimac, THE. (1) A frigate famous in the Civil War. It was originally a wooden vessel belonging to the Union, but it was sunk in the Norfolk navy yard in 1861 when the place was abandoned to the Confederates. She was reconstructed by the Confederate authorities as an ironclad, was renamed the *Virginia* and had set out upon a triumphant campaign against the wooden warships of the Federal government when the *Monitor* appeared on the scene. In the battle which followed, the *Merrimac* was not seriously damaged, but in May of the same year, when the Confederates evacuated Norfolk, she was destroyed. See **MONITOR**, THE.

(2) A collier sunk at Santiago de Cuba, June 3, 1898, by Lieutenant Hobson of the United States navy, in a vain attempt to bottle up the Spanish fleet then at anchor in the harbor.

Merrimac River, a river in New Hampshire and Massachusetts. It rises in the White Mountains, flows south, then east, and empties into the Atlantic near Newburyport, Mass. The immense water power furnished by its falls has created the towns of Lowell and Lawrence, Massachusetts, and of Nashua and Manchester, New Hampshire.

Mer'ritt, WESLEY (1836-1910), an American soldier, born in New York City and educated at West Point. He served through the Civil War and attained the rank of major general in the United States volunteers and lieutenant colonel in the regular army. He served with the Army of the Potomac until June, 1864, with Sheridan in his Shenandoah campaign and as commander of a corps of cavalry in the Appomattox campaign. After the war he served in various departments, took part in several Indian campaigns and in May, 1898, was assigned to the command of the United States forces in the Philippines. In December of that year he returned to the United States, and he retired in June, 1900, with the rank of major general in the regular army.

Mer'ry del Val', RAFAEL (1865-), a Catholic statesman and cardinal, born in London, educated at Brussels and at the Accademia dei Nobili Ecclesiastici. He became a favorite of Leo XIII, was promoted rapidly and after 1892 held important positions at the Vatican. He made an important and successful diplomatic visit to Canada in 1897. In the pontificate of Pope Pius X, Merry del Val was papal secretary of state.

Mersey, *mur'zy*, a river of England, which rises in the northern part of Derbyshire, flows westerly and enters the Irish Sea through a broad estuary nearly 18 miles long. The length of the river is 70 miles. The estuary is navigable for large vessels and forms the harbor of Liverpool. It is with this stream that the Manchester Ship Canal connects.

Merthyr-Tydfil, *mur'thur tid'vil*, a city of Wales, situated in the n. e. part of Glamorgan, 22 mi. n. w. of Cardiff. It is the center of the iron and steel industry of southern Wales and also has large collieries. Population in 1911, 80,990.

Merv, *merf*, an oasis in Central Asia, north of Afghanistan, the principal seat of the Tekke Turkomans, who from this center used to make predatory incursions into Persia and Afghanistan. In 1881 General Skobelev led a Russian expedition against the Tekke Turkomans, captured their stronghold of Greok Tepe and received the submission of the people. A railroad now extends through the oasis, and the district is an important strategic point.

Mesa, *ma'sa*, the name of a small plateau, usually having a flat surface and very steep slopes. The word is the Spanish name for *table*. Mesas are numerous in the southwestern portion of the United States and were formed by erosion (See **EROSION**). The top of the mesas indicates the former height of the plateau, which is from 200 to 500 feet above the surrounding country. Some of the mesas are covered with vegetation, but most of them are barren. Some of those in Arizona were formerly inhabited by a race of cliff dwellers and contain ruins which are of much interest. Some of them, as Mesa Encantada, or Enchanted Mesa, are regarded by the Indians with superstition. See **PLATEAU**.

Mes'entery, THE, the broad fold of the peritoneum which attaches the small intestines to the spinal column. It holds the intestines in place and contains the blood vessels and nerves which pass to the intestines, the lacteal vessels and the mesenteric glands, which make the chyle more abundant. The glands are about one hundred fifty in number and are about the size of an almond. See **ABDOMEN**.

Mesh'hed or **Meshed**, a town of northeastern Persia, capital of the Province of Khorassan. It contains the shrine of Imam Riza, the son of the founder of the sect of Shiites, and is the sacred city of that sect. The chief manufac-

tures are velvets, sword blades and turquoise jewelry. Population, about 60,000.

Mes'mer, FRIEDRICH ANTON (1733-1815), a German physician, the first to advocate the use of hypnotism, which thereafter for many years was known as mesmerism. He professed to cure diseases by stroking with magnets, but about 1776 he abandoned their use and declared that his operations were conducted solely by means of the magnetism peculiar to animal bodies; hence, this influence exerted by one person over another is sometimes known as animal magnetism. Mesmer went to Paris in 1778 and, achieving considerable fame, made many converts to his views, though the regular physicians regarded him as an impostor. A committee from the Academy of Sciences investigated his pretensions and gave an unfavorable report, which caused his system to fall into disrepute. See HYPNOTISM.

Mes'merism, a process by which people may be thrown into a sleep or trance. It was first practiced by Friedrich Mesmer, for whom it is named. See HYPNOTISM.

Mesolonghi, *me'so lon'ge*. See MISSO-LONGHI.

Mes'opota'mia, a name given by the Greeks to an extensive region enclosed by the Tigris and Euphrates rivers, anciently associated with the Assyrian and Babylonian monarchies. At different times it belonged to Assyria, Babylonia, Persia, Greece, Rome and Arabia. It is now a part of Turkey in Asia, and is inhabited chiefly by Arabs, Kurds and Armenians. Many of the inhabitants are nomadic, and their chief occupation is cattle raising.

Mes'ozo'ic Era, that division of geologic time extending from the Paleozoic to the Cenozoic Era and including the Triassic, Jurassic and Cretaceous systems. See PALEOZOIC ERA; CENOZOIC ERA; GEOLOGY, and the systems named.

Mesquite, *mes ke'tay*, a small tree or shrub allied to the acacia. It is common in Mexico, Texas and other parts of West and North America, where in dry regions it often appears as about the only conspicuous form of vegetation. It yields a gum resembling gum arabic, but much inferior. Its seeds are sometimes eaten, and from the mucilage of its pods a drink is made.

Messe'nia, a country of ancient Greece, in the southern part of the Peloponnesus. It is celebrated for the long struggle of its inhabitants with the Spartans, with whom they waged three wars between the eighth and fourth centuries B. C.

In 369 B. C. the Spartan yoke was finally shaken off, and Messenia was independent until the Roman conquest in 146 B. C. Messenia is a province in modern Greece.

Messi'ah (anointed), a term applied in the Old Testament to the priests, to the kings and even to Gentile kings, as persons who had been anointed with holy oil. Its special application in the prophetic books of the Old Testament was to an ideal holy king and deliverer, whose advent they foretold. The whole of the prophetic pictures agreed in placing Jehovah in the central place of the desired kingship. These Messianic prophecies had, at the time of Christ, come to be applied by the Jews to a temporal king who should free them from foreign oppression. They are affirmed by Jesus Christ and his apostles to apply to and be fulfilled in him; and this is the belief of the Christian church, by which he is called "The Messiah." The rationalistic school of theologians asserts that Jesus laid claim to the dignity, either to meet the preconceptions of his countrymen or because he felt that the truth which he taught was the real kingdom which God was to set up, never to be destroyed.

Messina, *mes se'nah*, the chief commercial town and seaport of Sicily, capital of the province of the same name, on the Strait of Messina, about 200 mi. s. s. e. of Naples. The harbor is one of the best built in the Mediterranean, and the town is well built. Although the town is of great antiquity, its appearance is fairly modern. The manufactures consist chiefly of silk goods. The principal exports are silks, olive oil, oranges, lemons and other fruit, wine, salted fish and fruit essences. Messina possesses a university founded in 1548 and a public library of over 56,000 volumes. The town was founded presumably in the eighth century B. C., but its authentic history begins only with the fifth century B. C. During the Middle Ages it was in the possession of various nations. In 1861 it became a part of Italy. On December 28, 1908, Messina was almost entirely destroyed by an earthquake. Population in 1911, 126,557.

Messina, STRAIT OF, the channel which separates Sicily from Italy and connects the Ionian Sea with the Tyrrhenian Sea. It is about 20 miles in length and about 12 miles at its broadest, and 2 miles at its narrowest, point. As the strait is very deep and the tidal current very strong, navigation is somewhat difficult. It was in the Strait of Messina that in ancient times the two sea monsters, Scylla and Charybdis, were supposed to dwell. See SCYLLA; CHARYBDIS.

Meta, *ma'tah*, a river of South America, a tributary of the Orinoco, which it joins in Venezuela, though the greater part of its course is in Colombia. It is about 600 miles in length and is navigable for about a third of this distance.

Metallurgy, *met'al lur'jy*, the art of separating metals from their ores. Metals are found in three classes of ores: those in which the pure metal occurs in veins or pockets, either in grains or loose nuggets; those in which the metals occur as oxides, and those in which the metals occur as sulphides. Ores of the first class need but little treatment. This consists in crushing the rock and separating the loose metal from it. This metal is then united into larger masses by smelting. The oxides constitute by far the largest class of ores, and it is from these that the supply of iron, lead, tin, copper and zinc is mostly obtained. Most of these ores can be reduced by smelting with a flux, as in the case of the manufacture of pig iron (See IRON). The sulphides are more difficult to treat, and some of them require several processes before the metal is obtained. In general, the treatment of this class of ores is as follows: The ore is crushed, and the metal-bearing portion is separated by running the crushed ore over vibrating tables, over which water is running. The particles containing the metal, being heavier than the others, settle at the bottom and form what is known as the *concentrate*. This concentrate is dried and roasted, to drive off the sulphur. The ore is then smelted; it yields an impure metal, which is purified by repeated smeltings. Copper ores containing sulphur are reduced in this manner.

Ores containing gold and silver are often treated by the *amalgamation* process. This consists in dissolving out the gold and silver with mercury. The ore is crushed in a stamp mill, in the trough of which mercury is poured. The gold and silver are obtained from the amalgam by distillation.

Low grade ores containing gold are often treated by what is known as the *cyanide process*. By this process the ore is crushed to a fine powder and subjected to treatment by a strong solution of cyanogen. This dissolves the gold or silver, while the other metals are left unchanged. The metals are then recovered from the solution by various processes. The gold is obtained by running the solution into a vat, in the bottom of which zinc shavings have been placed. The zinc collects the gold, which forms upon it in small nuggets or crystals.

Electrolysis is also extensively employed in metallurgy. By this process the ore or alloy is placed in a strong solution of the metal which it is desired to obtain and is then attached to the positive electrode, while a plate of the metal is attached to the negative electrode. When the current is caused to pass through the solution, it dissolves the metal from the ore and deposits it upon the plate attached to the negative electrode. The current may be provided either by a galvanic battery or by a dynamo, but where the work is carried on on a large scale, the dynamo is used. This method is particularly advantageous in obtaining copper from different ores, since that metal yields so readily to electrical action. The process is the same as that employed in electrotyping. See ELECTROTYPING.

Metals. Elementary substances have been divided by chemists into two classes, *metals* and *non-metals*, or *metalloids*, but these merge one into the other by gradations so imperceptible that it is impossible to frame a definition which will not either include some non-metallic bodies or exclude some metallic ones. Metals are opaque, having a peculiar luster, called *metallic*. They are insoluble in water; are solid, except in one instance, at ordinary temperatures; are generally fusible by heat; are good conductors of heat and electricity; are capable, when in the state of an oxide, of uniting with acids and forming salts, and have the property, when their compounds are submitted to electrolysis, of generally appearing at the negative pole of the battery. Many of the metals are also malleable, or susceptible of being beaten or rolled out into sheets or leaves, and some of them are extremely ductile, or capable of being drawn out into wires of great fineness. They are sometimes found native or pure, but more generally they are combined as ores with oxygen, sulphur and some other elements. Fifty-two of the elementary substances are usually regarded as metals, of which the following are the most important: aluminum, antimony, barium, bismuth, cadmium, calcium, cerium, chromium, cobalt, copper, gold, iridium, iron, lead, lithium, magnesium, manganese, mercury, nickel, platinum, potassium, silver, sodium, strontium, tin, tungsten, zinc. Each is described in its proper place in these volumes. Of these, gold, silver, copper, tin, lead, zinc, platinum and iron are the most malleable; gold, which possesses the quality in the greatest degree, is capable of being beaten into leaves $\frac{1}{1000}$ of a millimeter in thickness. In the order of their

ductility they are platinum, silver, iron, copper, gold, aluminum, zinc, tin, lead. Platinum wire has been made less than $\frac{1}{1200}$ of a millimeter in diameter. The majority of the useful metals are between seven and eight times as heavy as an equal bulk of water; platinum, osmium and iridium are more than twenty times as heavy; while lithium, potassium and sodium are lighter. The metals become liquid, or otherwise change their condition, at very different temperatures; platinum is hardly fusible at the highest temperature of a furnace; iron melts at a little lower temperature; silver, somewhat lower still, while potassium melts below the boiling point of water and becomes vapor at a red heat. Mercury is liquid at ordinary temperatures and freezes only at -39° F. Osmium and tellurium are regarded by some as non-metals. All the metals, without exception, combine with oxygen, sulphur and chlorine, forming *oxides*, *sulphides* and *chlorides*, and many of them also combine with bromine, iodine and fluorine. Several of the recently discovered metals exist in exceedingly minute quantities and were detected only by spectrum analysis, and there is every likelihood that research in this direction will add to the present list of metals.

Metamorphic, *met a mor'fik*, **Rocks**, in geology, rocks of any age, whose original texture has been altered and rendered less or more crystalline by subterranean heat, pressure or chemical agency. The name is given especially to the non-fossiliferous, stratified rocks, consisting of crystalline schists and embracing granitoid schist, gneiss, quartz rock, mica schist and clay slate, most of which were originally deposited from water and were later crystallized by heat and pressure. They exhibit for the most part cleavage, crumpling and folding, and their lines of stratification are often indistinct or obliterated. See METAMORPHISM.

Metamorphism, the term used by geologists to indicate the changes in structure and composition which rocks have undergone since their formation. While metamorphism does not apply to the decomposition of rocks, it may apply to their construction from decomposed material, as in the formation of sedimentary rocks from material that has been washed down from the hills and mountains. The most marked results of metamorphism are found in the oldest rock strata which have been changed by volcanic and other forces. The following are the changes resulting from metamorphism: (1) Hardening, as in the case of sandstones and other soft sedi-

mentary rocks; (2) change in composition and structure, as in the case of shales and slate; (3) crystallization, as in the formation of marble from common limestone. The agencies effecting these changes are heat, chemical action, moisture and pressure. Of these, heat and pressure are the most important. See GEOLOGY.

Metamorphosis, any change of form, shape or structure. In ancient mythology the term was applied to the transformations of human beings into inanimate objects, with which ancient fable abounds. In zoölogy the term at present includes those alterations in form which an animal undergoes in the process of its development from the egg to the mature individual. A typical metamorphosis is seen in the life history of the butterfly. The fertilized egg hatches into the larva, which, after reaching a certain stage of maturity, spins a cocoon and turns to the pupa, in which stage it remains quiescent for some time, then breaks forth from the cocoon transformed into the imago, or perfect butterfly, which lays the egg that begins again the circle of life (See INSECTS). While the metamorphosis of an insect is the typical form, yet many of the higher order of animals show similar changes. Among the amphibians, for instance, the frog lays eggs which become tadpoles that in time turn to adult frogs again. Similar changes may be recognized in the vegetable world.

Metaphor, *met'a for*, a figure of speech, founded on the resemblance which one object is supposed to bear, in some respect, to another, and expressed by transferring a name or epithet from an object, to which it properly belongs, to another, in such a manner that a comparison is implied, though not formally pointed out. It is in effect a simile without any word expressing comparison. Thus, "that man is a fox," is a metaphor; but "that man is like a fox," is a simile. So we say, a man *bridles* his anger; beauty *awakens* love or tender passions; opposition *fires* courage.

Metaphysics, *met'a fiz'iks*, a term generally applied to mental science, as distinguished from physical science. Metaphysics is of a higher order than all natural sciences, for its province is the consideration of the nature and validity of general notions, such as *matter*, *space*, *time*, *motion*, *cause* and *effect* and many others that are presupposed in all scientific investigation and theory. The physical scientist, for example, assumes that we live upon a sphere which is suspended in space and upon which all phenomena are governed by the law of cause and

effect. But the metaphysician is not content merely to assume the existence of space and the reality of the law of cause and effect; he *analyzes* these notions and determines their nature and value. Metaphysics is distinct from the science of psychology, for psychology deals only with the nature of the operation and laws of mental action, while metaphysics is concerned with the ultimate value of the general forms of thought peculiar to human consciousness.

Met'calf, VICTOR HOWARD (1853-), an American lawyer and politician, born at Utica, N. Y. He graduated from Yale Law School in 1876, was admitted to the bar in the same year and began practice in his native town. Two years later he moved to California, where he practiced law until 1904. He served three terms in Congress, was secretary of the department of commerce and labor from 1904 to 1906 and secretary of the navy from 1906 to 1908.

Me'teor, a name originally given to any atmospheric phenomenon, but now more usually applied to the phenomena known as shooting stars, falling stars, fire balls or bolides, aërolites, meteorolites or meteoric stones. It is generally believed that these phenomena are all of the same nature and are due to the existence of a great number of bodies, some of them very small, revolving round the sun, which, when they happen to pass through the earth's atmosphere, are heated by friction and become luminous. Under certain circumstances portions of these bodies reach the earth's surface, and these are known as meteorites, or meteoric stones. These stones consist of known chemical elements. They have this peculiarity, that whereas native iron is extremely rare among terrestrial minerals, it usually is present in meteorites. It is known as meteoric iron. Exceptionally large showers of meteors appear in August, from the ninth to the fourteenth day, and in November, on the thirteenth and fourteenth, every year. The November showers exhibit their greatest brilliancy every thirty-three years.

Me'teorology, the science which treats of the atmosphere, especially in its relation to climate and weather. Meteorology is a comparatively recent science, and its present degree of perfection has been reached through the observations made under the auspices of the governments of civilized nations. In making these observations, the conditions given the greatest weight are temperature, barometric pressure and humidity. Upon temperature and barometric pressure depend the prevailing winds,

which bring either fair or foul weather. The weather forecasts of a country are made known by a weather map, which appears daily, or oftener. The weather map of the United States bureau is published twice a day. This map shows the area of low pressure and the area of high pressure, which are marked respectively *low* and *high*. The direction of the wind is indicated, as are the places where rain or snow is falling. Places of equal temperature are connected by isotherms, and those of equal pressure, by isobars (See ISOBARS; ISOTHERMALS). All of these points of information are indicated by the use of symbols, which are described in explanatory notes accompanying the map.

By comparing the map under construction with the preceding one, the forecaster learns in what direction the areas of low pressure are moving and how far they have traveled during the interval. From this comparison, from the information contained in the last reports of the stations and from his experience, he is able to predict with a fair degree of certainty the weather for the various localities in his district for the next twenty-four or forty-eight hours.

Excellent weather bureaus are now maintained by Great Britain, France, Germany, Austria-Hungary and Japan, but that of the United States is the most extensive, and its information is the most generally distributed. See CLIMATE; STORMS; WEATHER BUREAU. Consult Davis's *Elements of Meteorology* and Ferrell's *Popular Treatise on Winds*.

Me'ter, the arrangement of words in rhythmic units, such as lines, stanzas and verses. The term is also applied to the unit of measure itself. A metrical line is divided into a number of units, called *feet*. In certain languages, particularly in Latin and Greek, the versification depends on the length of the vowels in the syllables in these feet; in English, however, as in the other Germanic and in the Romance languages, the meter depends on the number of syllables in a line and takes no account of the length of their vowels. The most common meters in English are iambic, in which a foot contains two syllables, an unaccented, or short, syllable and an accented, or long, syllable, in the order named; trochaic, in which a foot contains two syllables, a long and a short; anapestic, in which the foot has two short and one long syllable; dactylic, in which the foot has one long and two short syllables; amphibrachic, in which a foot consists of three syllables, the first and the last short, the middle one long.

Meter, the unit measure of length in the French, or metric, system, equal to about 39.37 English inches, or 3.28 feet, being the ten-millionth part of the distance from the equator to the pole, as ascertained by actual measurement of an arc of this meridian. See **METRIC SYSTEM**.

Meth'ane, Marsh Gas or Fire Damp, a gas produced by decaying vegetable matter under water, and therefore found in the gases which bubble up through stagnant water. It is colorless and odorless and burns with a blue flame. It is found in many coal mines and from its explosive nature has been productive of great damage.

Meth'odist Epis'copal Church. See **METHODISTS**.

Meth'odists, a general name given the followers of John Wesley. Wesley called his people the United Society. The first organization was formed in 1739. As the numbers increased, other societies were formed, and Wesley subdivided them into classes, placing a leader over each class. Each leader had his circuit, and several circuits were presided over by a clergyman, while Wesley was at the head of the organization. In 1741 lay preaching was introduced, and in 1784 the denomination became independent of the Church of England, the first act securing this independence being the consecrating of two men for missions in North America. In doing this, Wesley assumed power not granted him by the Church. At the conference held in Baltimore that year, the name *Methodist Episcopal Church* was assumed. While this is the leading branch of Methodists, there are a number of others. The Methodist Protestant Church grew out of a desire to have laymen admitted to the Church councils. In 1843 the Wesleyan Methodist Connection was organized by a following which was strongly opposed to slavery, and this was the beginning of a division of sentiment which led, at about the time of the Civil War, to the separation of the Church in the United States into two great divisions, the Methodist Episcopal Church, most of whose followers were opposed to slavery, and the Methodist Episcopal Church South, composed almost wholly of slaveholding members or members that were in sympathy with that institution. The Free Methodist Church was also organized in New York in 1860, and the African Methodist Church, designed particularly for colored people, was organized in Philadelphia in 1816, but

it did not receive any considerable membership until after the Civil War.

The chief doctrines of the Church are a belief that all men are sinners; that God the Father loves all men and hates sin; that Christ died for all men to make sure the salvation of all who believe in Him; that the Holy Spirit is given to all men to incline them to repent and believe in Christ; that all who repent are forgiven, regenerated and adopted as children of God, and that all who persevere to the end shall be saved in Heaven forever.

The governing body of the Church in the United States is a general conference, composed of the bishops and other general Church officials, of ministerial delegates and lay delegates elected by each conference, the number being apportioned in accordance with membership. This body meets every four years and legislates concerning all lines of Church activity. It also elects the general officers, such as bishops, secretaries and editors of the leading publications. The Church has always been active in missionary work and maintains missions in all parts of the world. In 1910 the number of communicants in the English-speaking world was 19,000,000, of whom over 6,800,000 were in the United States. There are also in this country about 42,000 ministers and 60,000 churches. The church also maintains numerous schools.

Meth'ods of Teaching, plans of procedure so as to obtain results in the instruction of children. The term *methodology* is also frequently used to denote the science of method. Since all learning is by mental activity of the learner, methods of teaching are founded upon the principles and laws of psychology, and the teacher should have a thorough acquaintance with these (See **PSYCHOLOGY**). The close relation of mind and body also makes it necessary that the teacher have some knowledge of the child's physical condition. She should at least understand the relation of effort to fatigue and the effect of fatigue upon the system, the plastic condition of the nervous system and the order of development of the mental powers. At school age the intelligence of children depends largely upon their home and neighborhood associations; hence, if she would be successful, the teacher must also become acquainted with the child's environment.

MENTAL PROCESSES. The mind is aroused to activity by impressions received through the special senses. When perceived, these impressions become ideas (See **SENSATION**; **PERCEP-**

TION). Ideas thus obtained are elaborated by mental processes, such as imagination and reason. There are, then, two sources of knowledge—the world about us, and the mind itself; but in order that the second source may be available, the mind must first acquire ideas through the senses. The first work of the teacher of young children is to assist them in getting these ideas. During the first few years, the child's powers of observation, his memory and his imagination should receive careful training. As the reasoning powers develop, the child should be led to increase his dependence upon them. From the fourth grade on, especially, the teacher should give attention to the development of the reasoning powers, as well as to the development of the powers of observation and memory. See CONCEPT; REASON.

PRESENTATION OF SUBJECTS. Attention is essential to learning. If the child is to acquire an idea, he must concentrate his mental powers upon it, and this requires an act of will. But before the child wills to give his attention to an object, he must feel that a knowledge of it will satisfy some want; that is, he must have an interest in it. The teacher's success depends upon her ability to awaken this interest. In her presentation of subjects, she should be guided by a few general principles. These are:

(1) Interest is common to all children, but often needs to be directed by the teacher.

(2) Children are most easily interested in what they know something about; therefore, in selecting subjects for young children, the teacher should have due regard for what they already know. It would be difficult to interest a beginning class of a rural school in a large building or a city street which they had never seen, and it would be equally difficult to interest a similar class of a city school in a cornfield if they had never visited the country.

(3) Children are not interested in what they cannot understand; therefore, each lesson should be a preparation for the one to follow, and the grade of work should be kept well within the capacity of the children.

(4) Interest leads to attention, and attention requires effort and is followed by fatigue. Most lessons in primary grades should not exceed ten or fifteen minutes in length. With older pupils the time can be extended, but in all cases, when interest begins to wane the exercise should be changed. The arrangement of the lesson

should be logical, so that pupils will have no difficulty in seeing the relations of the parts to each other, and the presentation should be such that the connection with the previous lesson is equally clear. The teacher's explanation should be in simple language and should contain such illustrations as will appeal to the pupil's experience. Descriptions should be clear, vivid and lifelike. See ATTENTION; FEELING; INTEREST.

FORMAL STEPS IN LEARNING. The pupil must take three formal steps in every complete act of learning, namely, the formation of the individual idea or notion, the formation of the class idea, or the general notion, and the application of the general notion to individual notions or ideas. In other words, these steps are the acquisition of knowledge, the classification of knowledge and the use of knowledge.

The Individual Notion. All ideas obtained through the senses or by concrete illustrations are distinct, as the idea of a chair, a house or a good deed. They are obtained by the observation of individual objects or by the hearing of particular instances of what others have done, and they contain the qualities belonging to each of these objects or instances, respectively. Their acquisition is the first formal step in gaining knowledge, and during the first ten years of his life, the child's mental energies are very largely occupied in acquiring individual notions. See PERCEPTION.

The General Notion. Unclassified knowledge is of but little use, and the child soon begins to compare his ideas. In so doing, he discovers their resemblances and differences. If he is acquainted with a cat and unacquainted with a dog, upon his first seeing a dog he may call it a cat, because he notices that each has four legs and fails to notice the points of difference. With further observation of dogs and cats, he discovers that they have more points of difference than of resemblance, and he forms a conclusion that a dog is not a cat. He has now arranged his ideas of dog and cat in two groups, each of which includes certain qualities that do not belong to the other. In a similar manner, he classifies all his other ideas. Each class idea is a general notion. Its formation requires the use of all mental powers and is much more difficult than the formation of individual notions.

A general notion includes only those qualities common to all the objects of the class to which it applies; that is, it is abstract. The notion *man* includes only those qualities common to all

men, and it cannot be perceived by the senses, but as soon as the idea comes into consciousness, it is applied to an individual, and its existence is seldom noted. For these reasons general notions are not easily understood.

The teacher should assist the pupil in the formation of general notions. The first step is to see that the pupil acquires correct and well-defined individual notions; the second is to prevent the formation of conclusions without sufficient observation, and the third is to show the pupils the value and importance of a good stock of general notions. The principles and rules of arithmetic are good illustrations of general notions. From the beginning of the study of number, the teacher should lead the pupils to discover these principles and to construct the rules. See **INDUCTIVE METHOD**.

Application of the General Notion. When a new idea is received, it is compared with ideas already in the mind and classified. If a child has formed the general notion *fruit*, the first time he examines a quince he will compare it with this idea and decide that it is or is not a fruit. His conclusion will be right or wrong according to the correctness of his general notion and the care with which he examines the object (See **APPERCEPTION**). This is the third formal step in the act of learning and is essential to the success of the other two. It is the measure by which they are to be judged. Use is the only true test of knowledge. Unless the pupils can apply their rules of arithmetic to the solution of real problems; unless they can apply their definitions in language to selections which they have not before seen, the teacher may be certain that their general notions are not well defined. Failure to apply general notions usually follows the memorizing of rules and definitions without first discovering them experimentally. Within the range of their capacity pupils should have a large amount of work requiring the application of the general notions which they have formed to new individual notions. See **DEDUCTIVE METHOD**.

While these mental processes and formal steps have, for the purpose of treatment, been considered separately, it should be remembered that they all belong together, but that at one time the teacher should give particular attention to one, and at another time to another, as the conditions require.

CLASSIFICATION OF METHODS. The particular stress placed upon the different steps in an act of learning has led some authorities to

classify methods as analytic or, synthetic inductive or deductive. By the first is meant the study of an object in such a manner as to discover its various qualities, which are considered one after the other. All objects are first apprehended as wholes, and their complex nature is afterwards determined by analysis. The second, or synthetic method, means the combination of qualities ascertained by analysis into a new whole, different from that with which we began. Inductive and deductive methods are explained under their respective heads.

But methods are classified for very much the same purpose as the mental processes are, and what are termed different methods are only different phases of method. A good method uses them all. In forming his individual notion of an orange, the child first comprehends it as a round, yellow object. He then proceeds to test it with all his senses and combines into his idea the qualities he thus ascertains. His second idea, a new whole, is much more complex than the first. In forming his general notions, the child holds in mind the qualities of the object which the notion includes, groups together those qualities common to all the objects in the class and rejects the others. In all the steps attending an act of learning, the question is the most potent instrument which the teacher can use. By questions she can direct the child's thought, steer him clear of entangling side issues and stimulate his attention until he reaches the desired end.

METHOD AND DEVICES. Careful distinction should be made between method and devices. The method is a systematic plan of teaching, based upon the laws governing mental development. A device is a scheme for assisting a pupil or a class to understand a principle or for holding the attention on a subject which of itself is not of particular interest. Blocks for teaching number, objects and pictures for teaching language, are devices to assist in carrying out the method selected by the teacher. Devices are useful and necessary, but they should always be chosen with care and so used as to assist in carrying out the method adopted. The danger attending their use is that they will be continued too long and will be given too much prominence.

In addition to the articles referred to, see **IMAGINATION**; **MEMORY**; **WILL**; **HABIT**. Consult McMurry's *General Method* and *The Method of the Recitation*; De Garmo's *Essentials of Method*; Compayre's *Lectures on Pedagogy*, and Salisbury's *The Theory of Teaching*.

Methu'en, MASS., a town in Essex co., 2 mi. n. of Lawrence, on the Spicket River and on the Boston & Maine railroad. It has the Nevins Memorial Library and contains manufactures of cottons, woolens, knit and worsted goods, yarns, baskets, organs and other articles. The place was settled in 1641 and remained a part of Haverhill until 1725. Population in 1910, 11,448.

Meth'yl Al'cohol. See WOOD ALCOHOL.

Meth'ylated Spirit or **Wood Spirit**, spirit of wine, containing ten per cent of wood naphtha, which contains a large proportion of methylic alcohol. The naphtha communicates a disagreeable flavor, which renders it unfit for drinking. It is of much use in the arts as a solvent for preserving specimens and in the manufacture of paints and varnishes.

Meton'ic Cycle, a cycle of nineteen years, invented by Meton the Athenian, about 432 B. C. The Greeks reckoned time by lunar months, and so, in order to bring their religious festivals and rites in accord with the seasons, they tried to make the solar year of 365 days, 5 hours, 48 minutes and 56 seconds into accord with twelve lunar months, or 354 days, 8 hours and 48 minutes. By Meton's invention, 7 months, 5 of them having 30 days and 2 having 29 days, were inserted, one every third, sixth, eighth, eleventh, fourteenth, seventeenth and nineteenth year of the cycle. The slight error in this was corrected afterward by Callippus. The date at which the Metonic cycle began is not certain, but authorities agree that the corrected Callippic cycle began June 29, 330 B. C. The number of any year in the cycle was called the *golden number*. Since the adoption of the Gregorian calendar, the golden number of any year is reckoned from 1 B. C., as in that year the new moon fell on January 1. To find the golden number of any year of the calendar, add one to the year and divide by nineteen. The undivided remainder is the golden number; if there is no remainder, the golden number is nineteen and the year is the last of a cycle. Thus, the golden number of 1904 was five. See EPACT.

Meton'ymy, the name given to the figure of rhetoric which consists in the substituting for one thing another which is closely related to it. Thus, a part may be substituted for the whole, the abstract for the concrete, or the symbol for the thing symbolized, as, "Gray hairs should be respected."

Met'ric System, a system of weights and measures of which the unit is the meter, which was originally equal in length to one ten-millionth

of a quarter of the meridian of the earth. This is divided into tenths, hundredths, thousandths, etc., for units of lower denominations, and multiplied by 10, 100, 1000, etc., for units of higher denominations. The names of the larger units are formed by the use of the Greek prefixes *deka* (10), *hekto* (100), *kilo* (1000), *myria* (10,000); the names of the divisions of the standard unit are formed by the use of the Latin prefixes *deci* (.1), *centi* (.01), *milli* (.001). Thus, 1 dekameter equals 10 meters, 1 hektometer equals 100 meters, 1 kilometer equals 1000 meters; 1 decimeter equals .1 meter, 1 centimeter equals .01 meter, 1 millimeter equals .001 meter. Even the units of capacity and weight are based upon the linear unit. Thus, 1 liter, which is the unit of capacity, equals a cubic decimeter. The gram unit of weight equals the weight of one cubic centimeter of distilled water at a temperature of 4° centigrade. The square dekameter, a common unit of surface measure, is also called the *are*. The square hektometer is called the *hektare*. The following table gives the approximate equivalent of the important units of metric weights and measures in units of the English system:

1 meter = 1.093 yds. = 3.28 ft. = 39.37 in.
 1 kilo. = $\frac{2}{3}$ mi.
 1 liter = 1 cu. dm. = 1 qt. = .028 bu. = 61.035 cu. in.
 1 kilog. = 2 $\frac{1}{2}$ lbs. avoird.
 1 gram = .002 lbs. avoird. = .032 Troy oz. = 15 $\frac{1}{2}$ gr.
 1 are = .025 acres = 119.603 sq. yds.
 1 hektare = 2.471 acres = 11,960 332 sq. yds.
 1 sq. meter = 10 sq. ft.

The metric units, being based upon the decimal system, are far more conveniently handled than those of the English system and are being adopted in all parts of the world. The metric system is now the obligatory system in Germany, Austria-Hungary, Belgium, Brazil, Chile, Argentina, Spain, Greece, Mexico, the Netherlands, Peru, Portugal, Rumania and Servia, Norway, Sweden, Switzerland and Venezuela and has been legally authorized in Egypt, Great Britain, Russia, Turkey and the United States. In the United States it is now used in the arts and sciences and in many governmental departments. Efforts have been made at frequent intervals for more than a century to have the system officially adopted in the United States, but so far without avail.

Met'ronome, an instrument consisting of a weighted pendulum moving on a pivot and set in motion by clockwork. Its purpose is to mark, by its vibrations, the quickness or slowness with which musical compositions are to be

executed. There is a sliding weight attached to the pendulum rod, by the shifting of which up or down the vibrations may be made slower or quicker, an accompanying scale indicating the number of audible beats per minute.

Metternich, *met'tur niK*, CLEMENS WENZEL NEPOMUK LOTHAR, Prince (1773-1859), an Austrian statesman. He represented Austria as ambassador at various European courts between 1801 and 1809. In the latter year he became minister of foreign affairs. In 1813, after the French reverses in Russia, Austria gave in her adhesion to the other allied powers and declared war against France. From this period the policy of Austria, and in a great measure that of the other leading Continental powers, was shaped by Metternich. His policy was always reactionary and strictly opposed to the feeling of nationality which was growing up in Germany (See HOLY ALLIANCE). He continued in power till, by the revolution of 1848, he was driven from office and had to flee to England, where he remained till 1851.

Metz, a city of Germany, capital of the district of Lorraine, at the confluence of the Moselle and the Seille, 80 mi. n. w. of Strassburg. The city consists of an older portion, with narrow streets, and a well-built newer part, which has beautiful open squares and some fine buildings. Among the most noteworthy buildings is the Cathedral of Saint Stephen, which was begun in the thirteenth century. The manufactures comprise leather, shoes, woollens, cottons, hosiery, hats, muslin and glue. From the middle of the sixteenth century, Metz belonged until 1870 to France. On October 27, 1870, Bazaine, with the French army, surrendered here to the Germans, and the city was included in the cession of territory to Germany at the peace of 1871. Since that time its fortifications have been greatly strengthened. Population in 1910, 68,598.

Meuse, *mōz*, a river of Europe which rises in France in the southern part of the Department of Haute-Marne and flows through France, Belgium and the Netherlands; and after joining the Waal flows into the North Sea. Its length is 575 miles, and it is navigable for about 400 miles. It is connected with the Moselle and the Oise by Canals.

Mexican War, **THE**, the war between the United States and Mexico in the years 1846-1848. The fundamental cause of this struggle was the desire of the pro-slavery party in the United States to secure additional slavery terri-

tory. This led to an early recognition of the independence of the Republic of Texas, in 1837, to the long agitation in favor of the annexation of Texas in spite of Mexico's earnest opposition, an end which was accomplished in 1845, and, finally, to a dispute over the boundary of Texas. As a Mexican state, Texas had been bounded on the south by the Nueces River, but when admitted to the Union it claimed, and was supported by the United States in the claim, that the Rio Grande was its natural boundary. In 1845 James K. Polk became president, and his open ambition was to gain for the United States all the territory of California, Oregon, New Mexico and Texas. He therefore ordered



General Taylor, who had been stationed at the Nueces River with about three thousand men, to cross that river and proceed to the Rio Grande. This was done and was answered by a counter-advance by the Mexicans into the disputed territory. On April 23, 1846, a small body of Americans was defeated by a force of Mexicans. Immediately President Polk sent a message to Congress, declaring that a state of war existed "through the act of Mexico herself." Congress accepted this partial view of the matter and on May 13 declared war and immediately voted money and supplies for its prosecution.

On May 8 General Taylor met a body of about six thousand Mexicans at Palo Alto and administered a severe defeat, though his own troops numbered but two thousand. The Mexicans fell back upon Resaca de la Palma, but were again defeated on the following day. Taylor's spring campaign ended May 18, when he occu-

pied Matamoros. There he remained until September, when he advanced upon Monterey, which fell after a short siege, September 24. Meantime, American troops had occupied New Mexico and upper California, and Colonel Doniphan had taken possession of the important territory around Chihuahua.

These American successes, however, were not sufficient to lead the Mexicans to overtures of peace; consequently, in the following spring General Scott was sent to the front with a new force. He also took ten thousand men from General Taylor's army. Scott landed at Vera Cruz on March 7, 1847, and conducted a continuous bombardment until March 27, when the city surrendered. The Mexican general, Santa Anna, though formerly exiled for his failure to accomplish the subjugation of Texas, had now returned and was in supreme command of the Mexican troops. He decided to march against Taylor, whose force had been depleted. He reached the vicinity of Monterey, February 20. Taylor retired to Buena Vista, where he inflicted a severe defeat three days later, with a loss of about eight hundred, the Mexican loss being fully twice as many.

Two months later Scott left Vera Cruz, stormed the mountain pass of Cerro Gordo and pressed on, driving the Mexicans before him, toward Puebla. There the Americans rested until August, when they moved forward about eleven thousand strong. On August 19 and 20 three severe battles were fought about ten miles from the City of Mexico, at Contreras, San Antonio and Churubusco. In all, the Americans were far outnumbered, but by the greatest skill and bravery they gained decisive victories. After an armistice of about three weeks, Scott advanced to the city's gates and won a brilliant victory at Molino del Rey. On September 13 he stormed the heights of Chapultepec and on the next day entered the Mexican capital in triumph.

The war was ended by the Treaty of Guadalupe Hidalgo, which was signed February 2, 1848. The most remarkable feature of the contest was the training which it furnished to young officers who later played conspicuous parts in the great Civil War. Among these were Stonewall Jackson, George B. McClellan, George G. Meade, U. S. Grant, Robert E. Lee and Jefferson Davis, who was to be president of the Confederacy. It also resulted in the elevation of General Taylor to the presidency in the following administration.

(For a more detailed story of the battles of the

Mexican War, see articles upon the important battles, also the biographies of the leading actors, and the article upon GUADALUPE HIDALGO, TREATY OF.)

Mex'ico, a republic of North America, between the United States and Central America. It is bounded on the n. by the United States and the Gulf of Mexico, on the e. by the Gulf of Mexico, the Caribbean Sea and British Honduras and on the s. and w. by the Pacific Ocean and Guatemala. The boundary between Mexico and the United States has a length of 1833 miles, of which the Rio Grande, the boundary between Mexico and Texas, forms 1136. The country narrows rapidly from its northern extremity. In the south, the peninsula of Yucatan turns northward, and on the west, the large narrow peninsula of Lower California, separated from the mainland by the Gulf of California, extends southward for about 700 miles. The total area of Mexico, including the islands about the coast, is 767,000 square miles, or nearly three times that of Texas.

SURFACE AND DRAINAGE. Mexico is, roughly speaking, composed of a large central plateau, or tableland, above which rise mountain peaks; two border ridges, the Sierra Madre Oriental on the east, and the Sierra Madre Occidental on the west, and narrow coast lands at the foot of the plateau. The principal summits which rise above the plateau are of volcanic origin. Some few of these are semi-active or dormant, but the greater number of them are extinct. The chief of these volcanoes are Orizaba, or Citlaltepetl (Star Mountain), 18,250 feet high, the loftiest point in the country; Popocatepetl (Smoky Mountain), 17,520 feet high, the most famous of Mexican volcanoes; Ixtaccihuatl (White Woman), 16,950 feet high; Nevado de Toluca, 14,950 feet; Malinche, 13,460 feet; Cofre de Perote, 13,400 feet, and Jorullo, 4330 feet. This last volcano is famous because it is said to have risen above the plain in a single night of its eruption in 1759. Most of these volcanoes are situated near the southern border of the great plateau. The three first named are above the limit of perpetual snow, which is here almost 15,000 feet.

The total coast line of Mexico is somewhat over 7300 miles. The ports on the Atlantic side are most of them insecure, and many of them are mere roadsteads. On the western coast there is, however, a series of magnificent ports from Acapulco to Guaymas, many of which are scarcely, if at all, frequented. This is accounted

for by the fact that they are separated from the industrial center of the country by lofty mountains, and transportation is therefore difficult and expensive. The largest river of Mexico is the Rio Grande del Norte, which forms the boundary between the United States and Mexico and belongs partly to each country. The other rivers are for the most part insignificant, as many of them are but rapid torrents, which descend from the central plateau to the sea, overflowing at some seasons of the year and drying up at others. The lakes of Mexico are numerous, but of little importance. Some of them have no outlet. Chapala, which is mostly in Jalisco, is the largest lake in the country.

CLIMATE. Mexico lies between latitude 14° 30' and 32° 40' north and is therefore for half of its length in the Torrid Zone. The peculiar structure of the surface, however, causes the greatest diversity of climate. The Mexicans divide their climate into three zones—the hot lands, along the coast, extending to an elevation of about 3000 feet; the temperate lands, from 3000 to 6000 feet above the sea, and the cold lands, 7000 feet or more above sea level. In the first of these zones the mean annual temperature is from 78° to 82° F., and the sea-coasts are exceedingly unhealthy. In the temperate zone the temperature is from 62° to 70°, and in the cold lands, from 59° to 63° F. The rainfall is exceedingly uneven. Over most of the plateau it is not more than 25 inches, while in some other parts of the country it is as high as 130 inches. Earthquakes are not infrequent, but they usually do little damage.

MINERAL RESOURCES. In its mineral resources Mexico is one of the richest countries in the world. It leads the world in the production of silver, and although the gold-mining industry has received comparatively little attention, on account of the great expense involved, it is known that there is gold in great abundance. Among the other minerals are copper, lead, quicksilver, tin, sulphur, salt, cobalt and antimony. In fuel, Mexico is deficient. Much of the coal used is brought from England and the United States, although there are coal beds in the country which, if they were not so far from lines of transportation, would furnish fuel in plenty.

AGRICULTURE. Mexico is a country of great natural resources. There is a vast variety of useful indigenous trees and plants, and many others have been introduced. In the forests along the coasts may be found palms and

acacias, rubber trees, mahogany, ebony and ironwood trees, while in the higher zones evergreen oaks, pines, firs and spruce flourish. The principal agricultural products are sugar cane, coffee, cacao, vanilla, corn, tobacco, indigo and the agave, or American aloe, some species of which are cultivated for their fiber, known as sisal hemp, and some for the juice, which, when fermented, forms the national beverage of Mexico, known as *pulque*. Stock raising is one of the leading industries of the country, especially in the north. The cattle are small and of rather inferior quality; the horses are small and hardy, and the sheep produce a coarse and inferior quality of wool. Much is being done, however, to improve the breeds of all of the domestic animals.

MANUFACTURES. The leading manufactures of Mexico are those of distilled liquors, cotton and woolen goods, pottery, tobacco and cigars, rum and molasses.

TRANSPORTATION. Within the last quarter of a century the railroad system of Mexico has been greatly improved. There are over 15,000 miles of railway in operation, and connections exist between all of the principal cities and commercial centers. The cities are supplied with tramways. There are 45,000 miles of telegraph lines, and telephone systems including 27,220 miles of line.

COMMERCE. Among the exports of Mexico, the precious metals are by far the most important, constituting on an average nearly one-half of the total exports, or, in the year 1910-1911, about \$71,000,000 out of about \$145,000,000. The other important exports are sisal hemp, copper, lead, coffee, woods, tobacco and animal products. The imports of the country, which are smaller in value than the exports, are largely cotton and woolen manufactures, wrought iron and machinery. By far the greater part of the exports go to the United States, which furnishes more than one-half of the imports, or, in 1910-1911, about \$55,000,000 out of about \$100,000,000.

INHABITANTS AND LANGUAGE. Of the population of Mexico, about 20 per cent are pure white, 43 per cent are of mixed race, and the remainder are indians. The increase of indian population is rather slow. The creoles, persons of Spanish-Aztec descent, are the dominant race, and the Spanish language is generally spoken throughout Mexico. Of the foreign nations, the English, the Germans and the French are best represented, and there are certain

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branches of trade which are almost entirely in the hands of these peoples.

EDUCATION. In most of the states of Mexico education is free and compulsory, but as the compulsory education laws are by no means strictly enforced, illiteracy is very common. Little has been done toward the education of the indians, and even the foreigners, except those who are prominently engaged in trade, are uneducated. The schools are supported partly by the central government, partly by the state governments and partly as charitable institutions. There are law, medical, agricultural and engineering schools and numerous museums and libraries, the most noteworthy of which is the national library, with 205,000 volumes.

GOVERNMENT AND RELIGION. Mexico is a federal republic, consisting of 27 states, 3 territories and a federal district, which comprises Mexico, the capital of the Republic, and a small portion of adjoining territory. The constitution, which was adopted in 1857, is modeled on that of the United States and leaves the states supreme in their internal affairs. The executive power is vested in a president, who is elected for a term of six years by electors chosen by the people. An amendment to the constitution was passed in 1890, providing that the president may be elected for any number of consecutive terms. There is no vice-president, but Congress has the power to choose an acting president when the president is unable to fulfill his duties. The cabinet consists of seven members, whose departments are foreign affairs, interior, justice and public instruction, fomento (industry and colonization), communication and public works, finance and public credit, war and marine. The legislative branch of the government is composed of a Senate and a House of Representatives. The representatives and senators are chosen by indirect election, the senators for four years, the representatives for two. There are two senators from each state and from the federal district, and half of them are chosen every two years. The judicial power rests with the Supreme Court and district and circuit courts. Each state elects its own governor and its own legislature, which usually consists of but one house.

Roman Catholicism is the prevailing religion, but there is no State Church. All religions are tolerated, but no religious body can own landed property. Out of over ten thousand churches, fewer than two hundred are Protestant. Some

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few of the indians hold to their idolatry, but most of them have been converted to Christianity.

CITIES. The chief cities are Mexico, the capital; Guadalajara, Puebla, San Luis Potosi, Guanajuato, Leon, Monterey, Merida, Vera Cruz, Oaxaca, Orizaba, Morelia, Pachuca, Zacatecas and Saltillo, each of which is described under its title.

HISTORY. Before 1521 Mexico was inhabited by the Aztecs and was ruled by native emperors. This race had attained a remarkable degree of civilization, and interesting remains of their architecture are extant in the teccallis, or pyramids, of Cholula, Puebla and Papantla (See AZTEC). In 1521 Mexico fell into the hands of the Spaniards under Cortez (See CORTÉZ, HERNANDO). Cortez called it New Spain and was created its captain general. Many Spaniards emigrated from Spain, and in time New Spain came to include a vast territory to the north of the present Mexico. The first viceroy was appointed in 1535, and from that time for almost three centuries the country remained a Spanish possession. The spirit of discontent caused by the selfishness of the Spanish rule manifested itself in open rebellion, when, in 1808, the unsettled state of affairs in Spain offered an opportunity. This rebellion, begun by a priest, Hidalgo, was continued with more or less vigor, and in 1821 the independence of Mexico was assured. After an unsuccessful attempt to secure a Bourbon prince for the throne, Iturbide, the chief of the insurgents, caused himself to be proclaimed emperor, in May, 1822. In the following year, however, he was forced to abdicate, and in 1824 a constitution, modeled in part on that of the United States, was adopted and a Federal Republic was proclaimed. Since the acquisition of its independence Mexico has had a most unsettled history, and has been the scene of almost incessant civil wars. A revolution in Texas in 1835 procured the independence of that territory, and eleven years later a dispute regarding the boundary of Texas led to a war with the United States (See MEXICAN WAR, THE). By the treaty which closed this war, New Mexico, which included part of the present Arizona and New Mexico, all of Utah and Nevada and part of Upper Colorado and Wyoming, were given up to the United States. In 1862-1863 a French army entered Mexico, and under the protection of Napoleon III, Maximilian reigned as emperor from 1864 to 1867 (See MAXIMILIAN). In 1867 the Republic was again pro-

claimed with Juarez as president. In 1876 Porfirio Diaz overthrew Juarez and assumed the presidency of the republic. For more than thirty-four years he ruled with such ability that the Mexican government was more stable than it had ever been before, and great material progress resulted. The rule of Diaz was despotic though brilliant, and the wretched economic conditions of the poorer classes caused mutterings and disorder which were suppressed only by force. He maintained his authority until 1911, when Francisco Madero headed a revolution which forced the resignation and flight of Diaz from Mexico. After Madero became president, in October, 1911, Mexico was in a state of continual turmoil. Diaz was too despotic, but Madero was too indulgent. Within a few months new revolutions were in progress in various parts of the country, and Madero was overthrown, imprisoned and finally assassinated in February, 1913.

Victoriano Huerta, Madero's Minister of War, assumed control as provisional president. He attempted to secure recognition from the United States, but this was denied on the ground that he did not secure his position by lawful means. Huerta had control of the central part of Mexico, but Madero's sympathizers, who styled themselves *Constitutionalists*, organized a strong revolution under the command of Venustiano Carranza in the north and Zapata in the south. Francisco Villa was Carranza's chief aid.

Occupation of Vera Cruz. Huerta was unable to control affairs and foreign relations became intolerable. In April, 1914, members of the United States navy who landed at Tampico to purchase supplies were arrested. The insult to the United States was so flagrant that Admiral Mayo in command of the fleet in Tampico harbor demanded that Huerta salute the American flag as an apology. This he refused to do and, on April 21, the American forces entered Vera Cruz, where they remained until November 23. Nineteen American marines were killed and seventy-five wounded in the capture of the city.

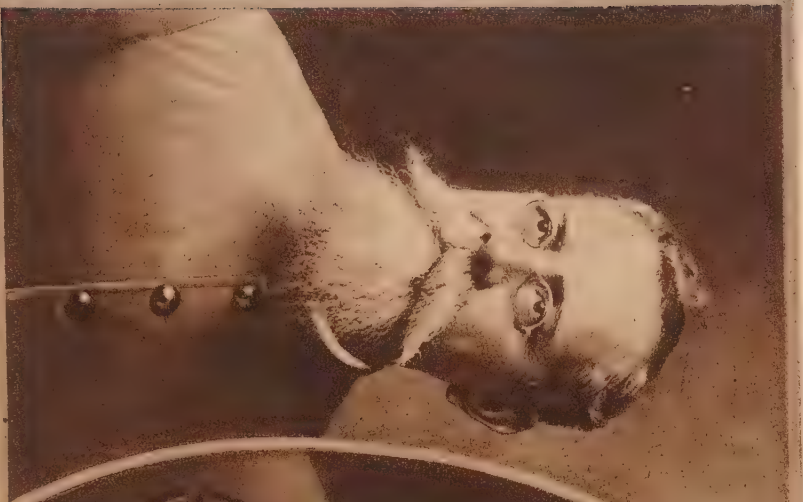
Mediation. At this juncture the diplomatic representatives of Argentina, Brazil and Chile in Washington offered their services as mediators between the two governments. The offer was accepted and the mediators met at Niagara Falls, Ontario. They continued in session for nearly two months and finally decided that a new provisional president would be elected by representatives of Huerta and Carranza. Be-

fore this election could be brought about, however, the military success of the Constitutionalists compelled Huerta to resign and flee from the country.

New Disorders. Within a year from the downfall of Huerta the country had five different presidents. Villa revolted from Carranza and organized so strong a following against him that for a time it seemed that the army of Carranza would be destroyed. But gradually Villa's forces began to disintegrate and Carranza obtained such control over the country as to lead President Wilson to recognize his government, October 19, 1915.

Events of 1916. During the early part of 1916 the United States and Mexico were on the verge of war. The massacre of American citizens on both sides of the international boundary by Villa bandits and the raid on Columbus, N. M., on March 8, caused President Wilson to order American troops into Mexico in pursuit of the bandits. General Pershing, with a force of 4,000 men which was later increased to over 6,000, went in pursuit of the bandits. About 100,000 of the National Guard were mobilized and sent to the border, where they remained until December, when several regiments were ordered home. Although the United States had repeatedly called Carranza's attention to these depredations, he was either unable or unwilling to make any effort to check them. But he strenuously objected to the presence of the United States troops in Mexico, and to avoid friction, the movements of General Pershing's forces were greatly restricted. Neither Villa nor any considerable number of his followers were captured. An attack upon a company of General Pershing's men by Carranza's troops complicated matters still more, although the attack was disavowed and a number of prisoners taken at the time were released.

In July the South American diplomats again attempted mediation with the result that commissioners from the de facto government of Mexico and the United States met in New London, Conn., September 6. It was finally agreed that the American troops should be withdrawn from Mexico, provided the Carranza government would protect the border. In compliance with this agreement, orders for their withdrawal were given in January, 1917. About 50,000 of the National Guard were left in Texas, New Mexico and Arizona to assist the regular army in patrolling the border. The population in 1910 was 15,063,207.



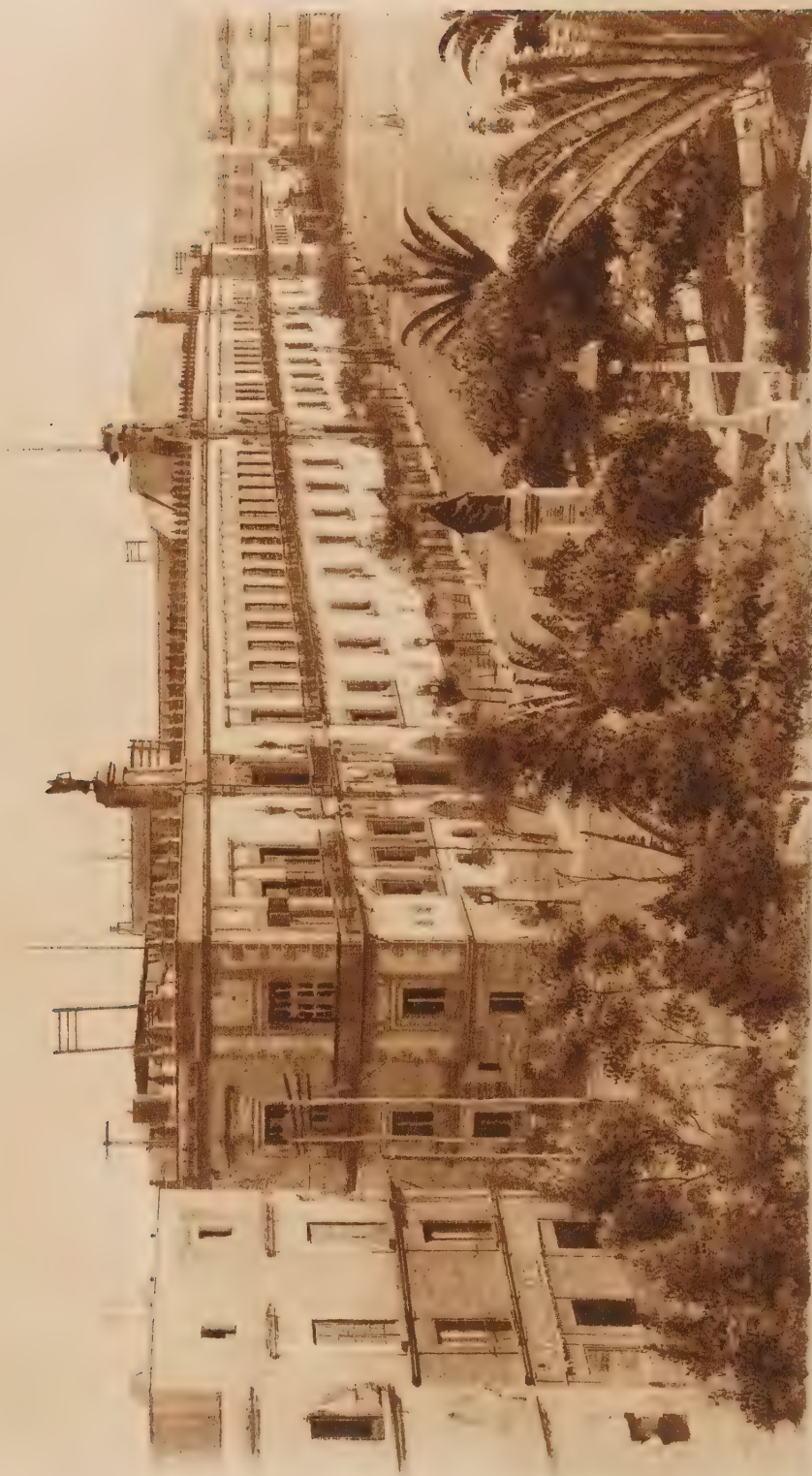
GENERAL VENUSTIANO CARRANZA
Former Judge and Governor, and friend of Madero. Leader of the so-called Constitutional forces.



GENERAL VICTORIANO HUERTA
Successor to Francisco Madero by usurpation of authority, whose acts threatened war with the United States. He styled himself "Provisional President."



GENERAL FRANCISCO VILLA
Rose to power from a bandit career, became an army leader, and returned to banditry.



NATIONAL PALACE, MEXICO CITY
The residence and business offices of the President of Mexico.

Consult Maturin M. Ballou's *Aztec Land*, Charles F. Lummis's *The Awakening of a Nation* and Elizabeth Visere McGary's *An American Girl in Mexico*.

Mex'ico, the capital of the Republic of Mexico, in the state of Mexico and within the federal district, about 7400 feet above the level of the sea. It is about equally distant from Vera Cruz, on the Mexican Gulf, and Acapulco, on the Pacific. It is built on a beautiful site and is laid out with great regularity. The city is distinctly Spanish in appearance, as a result of the long Spanish rule in Mexico. The great square, known as the Plaza de Mayor, or Plaza de Armas, is the center of the life of the city. The principal buildings are the cathedral, which forms one of the sides of the central square and is one of the most magnificent churches in America; the national palace; the National Museum of Natural History and Antiquities, which contains a remarkable collection of Aztec relics; the national library, which contains over 200,000 volumes; the mint, and the School of Mines. There are also numerous convents, hospitals, churches and theaters. The manufactures are of comparatively little importance and comprise linens, silks, gold and silver ware, hats, carriages and soap. The most of the trade is in the hands of foreigners. Mexico has a mild and healthful climate, and since the introduction of an improved system of drainage the death rate, previously very high, has decreased. Population in 1910, 470,659.

Mexico, GULF OF, a large bay or gulf of the Atlantic Ocean, on the eastern coast of North America. It is oval in form and is nearly surrounded by a continuous coast line of the United States and Mexico, about 3000 miles in length. Among the important rivers which empty into the Gulf of Mexico are the Mississippi, the Rio Grande, the Colorado of Texas and the Appalachicola. The most important ports on the gulf are Key West, Tampa, Pensacola, Mobile, Galveston, Tampico, Vera Cruz and Havana. The Gulf Stream issues from the Gulf of Mexico by the Florida Straits (See GULF STREAM).

Mezzo-Rilievo, *med'zo re lya'vo*, or middle relief, is the term applied in sculpture to figures that project one-half their thickness from the background. It is higher than bas-relief and lower than alto-rilievo. In *mezzo-rilievo* the figures are fully rounded, but there are no portions which are detached from the surface. See ALTO-RILIEVO; BAS-RELIEF.

Mez'otint, a particular manner of engraving on copper or steel, in imitation of painting in India ink, the lights and shadows being scraped and burnished out of a prepared dark ground. The surface of the plate is first completely covered with minute incisions, so that it would give in this condition a uniform black impression. The design is then drawn on the face, and the dents are erased from the parts where the lights of the piece are to be, the parts which are to represent shades being left untouched or partially scraped, according to the depth of tone. See ENGRAVING; ETCHING.

Mi'ca, the name of a group of minerals composed largely of aluminum and silica, with various proportions of potassium, sodium, iron, magnesium or some other mineral. The leading characteristic of the group is their formation into layers, which can be split into very thin plates, sometimes not more than $\frac{1}{300000}$ of an inch in thickness. Mica is always found surrounded by other rocks. It is separated from these and then cut into blocks, which are then split into sheets of such thickness as are desired for the various uses to which the stone is put. Sometimes plates as large as eighteen inches in diameter can be obtained. Mica is used for windows in ships and in other places where glass would be injured by jarring or by heat, as in doors of coal stoves. It is also used in the manufacture of dynamo electric machines. The most extensive quarries in the United States are at Grafton, N. H. India produces about half of the worlds supply, Canada and the United States the remainder.

Michael, *mi'ka el* or *mi'kel*, SAINT, in Jewish theosophy, the greatest of the angels, one of the seven archangels, Michael, Gabriel, Raphael, Uriel, Chamuel, Jophiel and Zadkiel, which "stand before God." The first three, the principal ones, are often represented together in Christian art. In the New Testament Michael is spoken of as the guardian angel of the Church.

Michaelmas, *mike'el mas*, the feast of Saint Michael the Archangel. It falls on September 29 and is supposed to have been established toward the close of the fifth century. In England, Michaelmas is one of the regular terms for settling rents. The Lord Mayor of London is elected on Michaelmas day.

Michelangelo Buonarroti, *me kel ahn'je lo bwo'na ro'te*, (1475-1564), a celebrated Italian sculptor, painter, architect and poet, born at Caprese, in Tuscany, of the ancient family of the counts of Canossa. He studied drawing

under Domenico Ghirlandaio and sculpture under Bertoldo at Florence, and having attracted the notice of Lorenzo de Medici, he was for several years an inmate of his household. When the Medici were sent into temporary disgrace and exile, Michelangelo, as one of their retainers, was forced to flee from Florence and took refuge in Bologna. In 1505 he was induced by Pope Julius II to settle in Rome. Here he sculptured the monument of the pontiff (including seven statues, among which was the famous one of *Moses*), now in the Church of Saint Pietro in Vincoli, and he painted the dome of the Sistine Chapel, his frescoes representing the creation and the principal events of sacred history. In 1530 he took a leading part in the defense of Florence against Charles V, being employed to build the fortifications around the city. Three years later he began his great picture in the Sistine Chapel, *The Last Judgment*, which occupied him eight years. His last considerable works in painting were two large pictures, the *Conversion of Saint Paul* and *The Crucifixion of Saint Peter*, in the Pauline Chapel. In sculpture he executed the famous *David*, popularly considered one of his best works. His statue of *Bacchus* was thought by Raphael to possess equal perfection with the masterpieces of Phidias and Praxiteles. As late as 1546 he was obliged to undertake the continuation of the building of Saint Peter's, by the order of Pope Paul III, and he planned and built the dome, but he did not live long enough to see his plan finished. Many alterations were made in it after his death. The remainder of his life was devoted chiefly to architecture. He undertook the building of the Piazza del Campidoglio (Capitol) of the Farnese Palace, besides many other edifices. His style in architecture is distinguished by grandeur and boldness, and in his ornaments the untamed character of his imagination frequently appears, preferring the uncommon to the simple and elegant. His poems, which he considered merely as pastimes, contain, likewise, convincing proof of his great genius.

Michelet, *me shlay'*, JULES (1798-1874), a French historian and miscellaneous writer, born in Paris. In 1821 he was called to the chair of history in the Collège Rollin, where he was also professor of ancient languages and of philosophy till 1826. After the revolution of 1830 he was appointed chief of the historical section of the archives of France, and in 1838 he became professor of history at the Collège de France. He lost all his offices at the political change in 1851,

because he refused to take the oath of allegiance to Napoleon III. His principal historical works are *History of France*, *Introduction to Universal History* and *Beginnings of French Law*.

Michelson, *mi'kel son*, ALBERT ABRAHAM (1852-), an American physicist, born in Strelno, Germany. He came to the United States when a child, and was educated at the United States Naval Academy. After his graduation, he spent several years in the navy, then resigned to pursue his studies in Europe. Upon his return he became Professor of Physics in the Case School of Applied Sciences, at Cleveland, Ohio. From 1889 to 1892 he was Professor of Physics in Clark University, after which he became head of the Department of Physics in the University of Chicago. Professor Michelson is known at home and abroad for his research work and discoveries. In 1882 he gave new figures for the velocity of light through a vacuum. A few years later he invented his inferential refractometer, an instrument with which he would measure the wave lengths of light. He is a member of numerous learned societies. In 1907 he was awarded the Nobel Prize for discoveries in physics. See NOBEL PRIZES.

Michigan, *mish'i gan*, the WOLVERINE STATE, one of the north central states, consists of two peninsulas, the upper and the lower. The upper peninsula is bounded on the n. by Lake Superior, on the e. by the Saint Mary's River, on the s. by Wisconsin and lakes Huron and Michigan and on the w. by Wisconsin. The lower peninsula is bounded on the e. by Lake Huron, the Saint Clair River, Lake Saint Clair, the Detroit River and Lake Erie; on the s. by Ohio and Indiana, and on the w. by Lake Michigan, the northern terminus forming a point which is separated from the upper peninsula by the Straits of Mackinac. The greatest length of the upper peninsula from east to west is 313 miles, and from north to south, 164 miles. The greatest length of the lower peninsula from north to south is 277 miles, and from east to west, 187 miles. The area of the state, including about 200 islands, is 57,980 square miles, of which 500 square miles are water. The coast line is about 1600 miles, being greater than that of any other state. The important projections are Keweenaw Peninsula, on the north, and the peninsula often known as the "Thumb," between Saginaw Bay and Lake Huron. The important indentations of the coast are Keweenaw Bay, and Whitefish Bay, at the head of Saint Mary's River, in Lake Superior; Green Bay and Grand Traverse Bay in Lake

Michigan, and Saginaw Bay, in Lake Huron. Population in 1910, 2,810,173.

SURFACE AND DRAINAGE. The upper peninsula has a rough, hilly or mountainous surface. It does not contain any high peaks, but is characterized by unevenness of land and a thin, rocky soil, with a low degree of fertility. It is traversed by the Porcupine and the Mineral mountains, the highest elevation being Porcupine Mountain, which is 2023 feet in altitude. The lower peninsula is generally level or undulating, the highest land being found to the southeast and northwest of Saginaw Bay. There is no point in this peninsula that rises over 600 feet above the lake. A mere depression, through which flow the Saginaw and the Grand rivers, extends from Saginaw Bay to Grand Haven on Lake Michigan. This is nowhere more than 75 feet above the level of the lakes and probably in former times was covered with water. The surface of the lower peninsula is dotted with a large number of small, clear lakes, most of which are surrounded by forests and are noted for their beauty and for abundance of fish. It is estimated that there are more than 5000 such lakes within the state. Along Lake Michigan there are numerous high bluffs and sand dunes, and the streams in the southern part of the state flow through well-worn channels.

The rivers are all short and of comparatively small volume. The streams of the upper peninsula flowing into Lake Superior are obstructed with rapids and falls. In length and size they are comparatively unimportant. The other streams in this section are the Menominee, forming a part of the boundary between Michigan and Wisconsin, the Ontonagon, the Sturgeon and the Escanaba, which flow into Lake Michigan. The largest streams of the lower peninsula are the Raisin and the Huron, flowing into Lake Erie; the Saginaw, the Au Sable, the Thunder Bay and the Cheboygan, flowing into Lake Huron, and the Grand, the Kalamazoo, the Saint Joseph, the Muskegon and the Manistee, flowing into Lake Michigan.

CLIMATE. There is a marked difference between the climate of the southern part of the lower peninsula and that of the upper peninsula. The latter is in the region of a cool temperate climate. The summers are cool and the winters are severe, and this portion of the state is subject to very heavy falls of snow. The presence of the lakes equalizes the temperature of the lower peninsula and also exerts a marked influence on the rainfall. The southern half of

the lower peninsula has a mild climate during summer and winter, and that portion of the state bordering on Lake Michigan and extending as far north as Grand Traverse Bay is influenced by the southwest winds which prevail throughout the year. These winds equalize the temperature of this region, so that for a distance of from five to ten miles inland, damaging frosts seldom occur. Here the winters are never very cold nor the summers very warm, but farther inland the winters are as severe as in other parts of the state. These conditions are especially favorable to the growing of fruit, and this region constitutes the Michigan fruit belt. The average rainfall in the state is about 30 inches, and it is evenly distributed through the year, so that all sections have sufficient moisture for agricultural purposes.

MINERAL RESOURCES. The upper peninsula is one of the most important iron-producing regions of the world, ranking, in the amount of ore mined, second only to the Minnesota iron region, and in Keweenaw Peninsula are located the great copper mines, which for many years supplied nearly all of the copper produced in the United States and only recently have been out-ranked by the mines in Montana and Arizona (See COPPER; IRON). Michigan is also one of the leading states in the Union in the production of salt. The largest mines are around Manistee and Saginaw Bay. The salt is obtained by passing water through the mines, to dissolve the salt, then evaporating the water, to secure the mineral. There are also large deposits of gypsum about Grand Rapids, and Michigan leads the Union in the production of this mineral. Numerous deposits of rock from which Portland cement is made are found throughout the state. Clay which is excellent for brick and tile and also suitable for pottery also occurs in many localities.

AGRICULTURE. The soil and climate of the southern half of the state are remarkably well suited to the growing of nearly all crops produced in the temperate climate. A region in the central part of the northern portion of this peninsula, however, contains light, sandy soil that is not particularly well suited to tillage. The leading crops are hay, corn, oats, wheat, potatoes and sugar beets. In the production of the latter, Michigan is the second state in the Union. In the fruit belt large quantities of apples, peaches, plums, cherries and small fruits are grown, the peach crop varying from 500,000 to 1,000,000 bushels a year. The

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raising of live stock and dairying are also important branches of agriculture. The growing of particular crops in localities where soil is especially suited to them is a unique feature of the agriculture of this state. In some sections swamp lands which have been drained are especially suited to the raising of celery and peppermint. The largest peppermint farm in the world is in Allegan County, and in the manufacture of peppermint products Michigan leads the world.

MANUFACTURES. The manufactures constitute an important industry. Formerly the extensive pine forests in the northern part of the lower peninsula led to the establishing of numerous factories for the manufacture of lumber, doors, sash, furniture and other lumber products. Though the supply of lumber in this region has been exhausted, many of the factories are still active, and Grand Rapids is one of the largest furniture manufacturing centers in the world. Other manufactures include wagons and carriages, stoves, engines, machinery, automobiles, agricultural implements, cars and other railroad appliances and grist mill products. There are also large quantities of paper and wood pulp products, Kalamazoo being the chief center of this industry. Slaughtering, meat packing, the tanning, currying and finishing of leather and the manufacture of beet sugar are also important, and a flourishing chemical manufactory is located in Detroit. Detroit is the largest manufacturing center because of its convenient situation for lake navigation and railway transportation, but the industries are distributed quite widely throughout the state.

TRANSPORTATION AND COMMERCE. Her extensive coast line has given Michigan many good harbors; she has greater facilities for water transportation than any other state, and the tonnage of Michigan ships exceeds that of any other state except New York. The southern half of the state also contains numerous trunk lines of railway, extending east and west and connecting at Detroit and Port Huron with Canadian lines. The upper portion of the lower peninsula has a number of lines extending north and south. The upper peninsula contains a number of lines extending east and west, with cross lines, so that the leading towns have railway communication.

The commerce of the state is extensive. The exports consist of lumber and its manufactured products; iron ore, salt, fruit and fish, the catching of which is an important industry.

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The imports are such manufactured articles and food products as cannot be profitably made or raised.

GOVERNMENT. The legislature consists of 32 senators, elected from districts, and a house of representatives limited to 100 members. The members of each house are elected for two years. The legislature meets biennially and is not limited as to length of the session. The governor and lieutenant governor are elected for two years, as are the secretary of state, the treasurer, the auditor, the attorney-general and the superintendent of public instruction. The judicial department comprises a supreme court, consisting of eight justices, chosen by popular vote for eight years, and circuit courts, presided over by circuit judges elected for six years. Each county has a probate court, and justice courts are found in every township. The justices of the supreme court are required to reside at the state capital, and the justice whose term expires first is chief justice during his last year of service.

EDUCATION. The state maintains an efficient school system, under the supervision of a superintendent of public instruction. The schools for each county are in direct charge of a county school commissioner, elected for four years. There are also township boards of education of three members, and each school district has a board of five trustees for graded schools and three for ungraded schools. The number of members on city boards of education is fixed by the charters of the respective cities. The support of public schools is obtained from the state fund, from local taxation and from the sale of state school lands, of which there are still large areas. The State Normal College is located at Ypsilanti and was the first normal school established west of New York. Normal schools devoted to the preparation of teachers for the rural schools and for lower grades are at Mount Pleasant and Marquette. The state university, which is one of the best in the Union, is at Ann Arbor (See MICHIGAN, UNIVERSITY OF). The state agricultural college, located two miles east of Lansing, is under the management of the state board of agriculture, and the school of mines is located at Houghton. There are also a number of colleges and secondary schools in the state maintained by religious denominations. Among these are the Detroit College at Detroit, Albion College at Albion, Adrian College, Alma College, Hillsdale College, Kalamazoo College, Olivet College and Hope College at Holland.

INSTITUTIONS. The state public school for dependent children is at Coldwater, the school for the deaf and dumb is at Flint and the school for the blind is at Lansing. The asylums for the insane are at Kalamazoo, Pontiac, Traverse City and Newberry. There is a home for the feeble-minded at Lapeer and a state soldiers' home at Grand Rapids. The penal institutions comprise the penitentiaries at Jackson and Marquette, a house of correction at Ionia, an industrial school for boys at Lansing and an industrial school for girls at Adrian.

CITIES. Detroit and Grand Rapids are the only large cities in the state, but there are a number of others which are important railroad and industrial centers. Chief among these are Lansing, the capital; Saginaw, Bay City, Jackson, Kalamazoo, Muskegon, Port Huron, Battle Creek, Flint and Manistee, in the lower peninsula; Laurium, Ishpeming, Marquette, Escanaba, Menominee, Hancock and Ironwood, in the upper peninsula, each of which is described under its title.

HISTORY. French Jesuit missionaries and traders had visited Michigan as early as 1610, but the first permanent settlement was founded at Sault Sainte Marie by Marquette and others in 1668. Numerous villages were soon established, and Detroit was founded in 1701. The territory made little progress under French occupation and in 1763 passed to the English by the Treaty of Paris. During Pontiac's War the garrison at Mackinac was massacred, and Detroit was besieged for over five months, but without success. In 1774 the territory was annexed to Quebec, but by the Treaty of Paris in 1783 it passed to the United States. Thereafter for several years the Indians were restless, and they were not finally subdued until 1795. Michigan was for a time a part of the territory of Ohio and of Indiana, but was made a separate territory in June, 1805, with William Hull as governor. It was the scene of important operations during the War of 1812. A dispute with Ohio concerning a strip of land along the southern boundary of the state led to delay in the admission of Michigan to the Union, but the state was recognized January 26, 1837. After that time, for a number of years, the state was the victim of a spirit of speculation, which retarded its growth. The capital was removed from Detroit to Lansing in 1847. An amendment to the state constitution was adopted in 1853, prohibiting the manufacture and sale of intoxicating liquors, but this was repealed in

1876. During the Civil War Michigan contributed largely to the Union armies. Since that time the chief issues in state politics have been the taxation and regulation of corporations. The Republican party has usually controlled the state. Consult Cooley's *Michigan*, in the American Commonwealths Series.

Michigan, LAKE, the second largest of the great lakes of North America. It is wholly within the United States, having the State of Michigan on the east and northwest, Wisconsin and Illinois on the west and Indiana on the south. On the northeast it communicates with Lake Huron by the narrow Straits of Mackinac, and on the south with the Mississippi by the old Illinois and Michigan Canal and the new Chicago Drainage Canal. It is 350 miles long, on an average is 60 miles broad and has an area of 22,450 square miles. Its depth is about 870 feet, and its elevation above the sea, 581 feet. The largest island in the lake is in the northern portion, Beaver Island, 50 miles long. There are two large bays, Green Bay and Grand Traverse Bay. The largest rivers emptying into it are the Saint Joseph, the Muskegon, the Grand, the Kalamazoo and the Manistee. The chief ports are Chicago, Milwaukee, Escanaba and Grand Haven. The fisheries of this lake are very important. See **GREAT LAKES**.

Michigan, UNIVERSITY OF, a state university established at Ann Arbor in 1837, by act of legislature, and opened in 1841. As originally established, the charter provided for departments of literature, science and art, law and medicine; but as now organized, the following departments are maintained: Literature, science and arts, engineering, medicine and surgery, law, a school of pharmacy, a homeopathic medical college and a college of dental surgery. Each of these departments has several courses and is maintained on the broadest possible plans. The university has always been known for the thoroughness and high standard of its scholarship and the excellent equipment of its graduates. The affairs of each department are managed by the faculty of that department, and those pertaining to the university as a whole, by a senate, composed of members from each of the faculties. This is the first great university to provide for the education of women, becoming co-educational in 1870 and opening all departments to women on equal footing with men. The library contains about 260,000 volumes, besides pamphlets and, in addition to this, it has

special medical and law libraries, which contain about 40,000 volumes. Besides the regular university buildings, there are gymnasiums for men and women, also an excellent observatory, donated by citizens of Detroit. The faculty numbers about 300, and the average enrollment exceeds 5500.

Michigan City, IND., a city in Laporte co., on Lake Michigan, about 40 mi. e. of Chicago, on the Pere Marquette, the Michigan Central and other railroads. The transportation facilities are good, and there is an extensive trade in lumber, salt and iron ore. The manufactures include railroad cars, chairs, glass, hosiery, knit goods, lumber and lumber products. The Northern Indiana State Prison is located here, also a United States life-saving station. There are a number of large, interesting sand dunes along the lake shore. It is a popular summer resort. The place was laid out in 1832 and was incorporated five years later. Population in 1910, 19,027.

Mi'crobe. See BACTERIA AND BACTERIOLOGY.

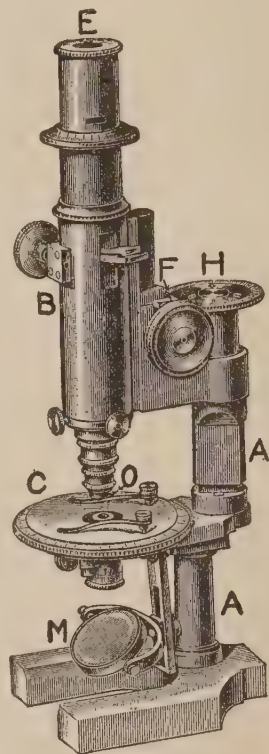
Microm'eter, an instrument used with a telescope or microscope for measuring very small distances. There are several patterns of micrometer, but the one in most common use consists of a circle divided into squares by cob-web threads. The number of squares covered by the object enables the observer to determine its size. Micrometers on surveyors' instruments usually measure distances by means of a screw with a very fine thread. The turning of the screw moves a plate, and the distance moved is known by the number of turns given the screw.

Mi'crophone, an instrument to make faint sounds more audible, invented by Mr. Hughes in 1878. The most sensitive conductor of sound is willow charcoal, dipped when at white-heat into a bath of mercury. A piece of charcoal, thus prepared, placed vertically between two carbon blocks, which are connected with a telephone, is a common form of microphone and magnifies sounds otherwise inaudible. A perfect instrument will enable one to hear the patter of a fly's feet when the insect is walking across the disk.

Mi'croscope, an instrument for obtaining a highly magnified image of a very small object. The simple microscope consists of a double convex lens, which is placed between the object and the eye. It is usually known as a magnifying glass (See LENS). The compound microscope

consists of a stand, *A*, upon which are mounted two tubes, *B*, so fitted that one will slide within the other; a stage, *C*, which holds the object, and under which is a small mirror, *M*, for reflecting the light upon the object. The tube contains the object glass, *O*, and the eyepiece, *E*. The rack and pinion, *F*, enable the tube to be raised and lowered so as to focus the object. *H* is a screw having a very fine thread, which can be used when a delicate adjustment of the focus is required. If the microscope has two tubes, so arranged that it can be used with both eyes, it is called a *binocular*. The magnifying power of the microscope depends upon the power of the object glass and of the eyepiece and the distance between these lenses. The object glass forms a magnified image of the object, and the eye glass can magnify this. By extending the tube so as to increase the distance between the eye glass and the object glass, the power of the microscope is quite materially increased.

Mi'das, in Greek and Roman mythology, a Phrygian king. One legend tells that in punishment for having decided a musical contest between Pan and Apollo in favor of Pan, he was given ass's ears by Apollo. This deformity he concealed from all except his barber, whom he compelled to swear to tell no man. The barber, however, unable to keep the secret to himself, dug a hole in the earth, into which he whispered it; soon after, reeds grew up over the spot and, as they rustled, announced to all who passed by, "King Midas has ass's ears; King Midas has ass's ears." Another story tells that Midas, having captured Silenus, the companion of Bacchus, returned him to Bacchus and as a reward was promised any gift he might



COMPOUND MICROSCOPE

ask. Midas petitioned that he might have the gift of turning everything he touched to gold, and his request was granted. He soon found, however, that this strange ability brought with it great inconvenience, as all of his food and drink turned to solid or molten gold as soon as it touched his lips. Moved by his distress, Bacchus instructed him to bathe in a certain river, and the golden touch left him.

Middle Ages, a term applied loosely to that period in European history which lies between the ancient and modern civilizations. Various dates are given for the beginning of the period: the Fall of Rome, 476; the crowning of Charlemagne, 800; the death of Charlemagne, 814; the end of the Frankish Empire, 843. The period is variously conceived to have closed with the Reformation in Germany; with the discovery of America by Columbus; with the invention of printing and with the end of the Thirty Years' War in the Peace of Westphalia (1648). The first part of this period, from the Fall of Rome to the Revival of Learning, is usually called the Dark Ages.

Middleboro, MASS., a town in Plymouth co., 30 mi. s. of Boston, on the Nemasket River and on the New York, New Haven & Hartford railroad. It has a picturesque location and is a popular summer resort. The river has three falls and furnishes good water power for the factories, which include establishments for the manufacture of woolen goods, shoes, lumber, marble and foundry and machine shop products. Middleboro was settled on the site of the indian village Nemasket about 1662 and was incorporated in 1669. Population in 1910, 8214.

Middlesboro, KY., a city of Bell co., on the Louisville & Nashville and the Southern railroads, 43 mi. n. of Nashville, Tenn. It is near coal mines, and the leading industries include distilling and the manufacture of coke and of foundry products. Population in 1910, 7305.

Middlesbrough, *mid'dl'z b'ruh*, a seaport of England, situated at the mouth of the Tees, 48 mi. e. n. e. of York. The city has broad streets, a beautiful park and excellent public buildings. It is in the midst of the Cleveland iron district, and its industries consist of smelting furnaces and foundries, the manufacture of railway rails, locomotives, boilers and other machinery. The iron trade is carried on on an extensive scale. There are also factories for the manufacture of pottery and chemical works. Salt is obtained from wells. The harbor is

good, and there is an extensive wharf protected by a breakwater. Population in 1911, 104,767.

Mid'dletown, CONN., the county-seat of Middlesex co., 18 mi. s. of Hartford, on the Connecticut River and on the New York, New Haven & Hartford railroad. The city is in an agricultural region where tobacco is the principal product. The leading manufactures are bone, cotton, rubber and silk goods, pumps, harness and hardware. Wesleyan University, Berkeley Divinity School, the state hospital for the insane and the state industrial school for girls are located here. The place was settled in 1650 and was incorporated the next year as the town of Mattabeseck. It was given its present name two years later and was chartered as a city in 1784. Population in 1910, 11,851.

Middletown, N. Y., a city in Orange co., 67 mi. n. w. of New York City, on the Erie, the New York, Ontario & Western and other railroads. It is in an agricultural and dairying district, has a considerable trade in farm products and contains hat factories, car shops, cigar factories, glass works and other establishments. The state homeopathic hospital for the insane is located here, and the city has the Thrall Public Library and a fine high school building. The place was settled before the Revolution and was named from its central location, halfway between Montgomery and Mount Hope, and between the Hudson and the Delaware rivers. Population in 1910, 15,313.

Middletown, OHIO, a city in Butler co., 35 mi. n. of Cincinnati, on the Miami River and the Miami & Erie Canal and on the Cincinnati, Hamilton & Dayton, the Cleveland, Cincinnati, Chicago & Saint Louis and other railroads. There are extensive manufactures of tobacco, paper, bicycles, agricultural implements and other articles. The city has a fine opera house and a Masonic Temple. Middletown was settled in 1794. Population in 1910, 13,152.

Middletown, PA., a borough in Dauphin co., 9 mi. s. e. of Harrisburg, on the Susquehanna River and on the Pennsylvania and the Philadelphia & Reading railroads. It is in a farming region and contains flour and planing mills, tanneries, stone quarries, iron furnaces, stove works, car shops and other factories. It was settled in 1756 and was made a borough in 1828. Population in 1910, 5374.

Mid'ianites, an Arabian tribe, represented in the Old Testament as the descendants of Midian, son of Abraham by Keturah, and described as engaged at an early period in a commerce with

Egypt. They dwelt in the land of Moab, to the southeast of Canaan.

Mif'fin, THOMAS (1744-1800), an American soldier and statesman, born at Philadelphia. He was elected to the colonial legislature and in 1774 became a delegate to the Continental Congress. He fought in the Revolutionary War, attaining the rank of major general, and was appointed to be member of the board of war. He became dissatisfied with Washington's policy, however, and was prominent in the intrigues of the Conway Cabal (See CONWAY CABAL). He was replaced by General Greene as quartermaster-general, in March, 1778, and in the following October he retired from the board of war. In 1782 he was elected to Congress and became its president, but three years later he returned to his state, entered the legislature, was sent as a delegate to the Federal constitutional convention and from 1790 to 1799 was governor of Pennsylvania.

Mignonette, *min yun et'*, a flower that is cultivated almost everywhere in gardens during the summer and as a house plant in winter. Its smooth leaves are entire or divided into three parts, and the small, rather unattractive flowers are borne in clusters at the end of the stem. The chief charm of the plant is its fragrance.

Migra'tion of Animals. Certain animals move either periodically or at irregular times and seasons from one locality to another, sometimes far distant. Occasionally migrations are caused by failure of food or some other condition which forces the animals to leave the region where they are living. The inroads which the Rocky Mountain locusts have made in the United States and the plagues of flies and other insects which have appeared in the East have been owing to this cause. The chinch bug and the army worm are other insects that migrate in search of food and make no effort to return to their original home. This is true also of the peculiar migration of the European lemmings, small, mouse-like animals which, every few years, in vast numbers leave their home in the extreme northern part of Europe and travel at night toward the south and west until they are exterminated.

It is to birds, however, that we must look for the most regular and perfect example of migration. Before food supplies have failed in the warmer parts of the South, many of its birds leave for the North, sometimes traveling several thousand miles and terminating their journey with the region in which they nest. At the approach of cold weather, they return again

South, where they spend the winter. In the United States this migration may be said to begin early in February, with the approach of the robin and bluebird, but it does not reach its height until toward the middle of May. The earliest birds come as soon as the weather is warm, with little attention to the season. From then on, the number of species traveling north increases steadily, growing more and more definite in point of time; in fact, the date of the arrival of the warblers and other late species is known almost to a day. The enormous numbers of these migrating birds, the regularity of their departure and return, the long distances they cover in flight without rest, are among the marvelous things of nature. Many birds migrate openly in the day time, but the large flocks of more timid birds fly only at night, and feed during the day in retired places. Year after year the general routes of migration are the same, following the seacoast and the great water courses until the birds reach their chosen location, when they distribute themselves in all directions. During the spring migration the male birds don their brilliant spring plumage and are easily recognized, but on their return in the fall they are duller in color and are accompanied by the females and the young, also in plumage less easily recognized, so that the fall migration never attracts as much attention as does that of the spring. Not all species of birds are migrants; in fact, the larger number are not. Those which do migrate are confined to a few groups of high organization, who feed largely upon worms and insects, or who use them as food for their young, or who depend for food upon the wet places that are closed by frost.

Mil'an, or *mil lan'*, the largest city of Lombardy, and the second city of Italy, capital of the province of its own name, situated on the small river Olona in the middle of the plain between the Adda and the Ticino. The city is entered by a number of gates, several of which are magnificent, and the leading streets proceeding from these gates are tolerably wide, well-paved and lighted. The chief open square and the center of the life of the city is the Piazza del Duoma (Cathedral Square), in which is located the celebrated cathedral which, after Saint Peter's at Rome, is the largest church of Europe (See MILAN CATHEDRAL). Among the other noteworthy buildings are the Church of Sant' Ambrogio, built on the site of a church founded by Saint Ambrose in the fourth century; the Church of Sant' Eustorgio; the Church of Santa Maria

delle Grazie, in the refectory of which is the celebrated *Last Supper* of Leonardo da Vinci; the royal palace; the archiepiscopal palace; the palace of arts and sciences, with a library of 230,000 volumes and a magnificent collection of pictures, and the Ambrosian Library. The manufactures of Milan include silks, cottons, lace, carpets, hats, earthenware, jewelry, gloves and art furniture.

The first distinct notice of Milan occurs in 222 B. C., when it was subdued by the Romans. In the third century A. D. it was second in rank to Rome, and at the close of that century it was made the capital of Italy by Diocletian. In the twelfth century it was the strongest of the city republics and had acquired the leadership of the other cities, and two centuries later it was made a duchy for the family of the Visconti, who gradually became supreme over almost all of Lombardy. Among the most famous rulers of the city were the Sforzas. On the extinction of the Sforza dynasty, Charles V united Milan with Spain. In the early eighteenth century it was ceded to Austria, and under Napoleon it became the capital, first of the Cisalpine Republic and then of the Napoleonic kingdom of Italy. It was restored in 1815 to Austria, from whose rule it was freed only after the Battle of Magenta in 1859. With the rest of Lombardy it was surrendered to Sardinia and became part of United Italy. Population in 1911, 599,200.

Milan Cathedral, a famous Gothic cathedral in Milan, inferior in size to Saint Peter's at Rome, but in some respects a close rival. Its foundation was laid in 1386 by Gian Galeazzo Visconti, and many of the greatest European architects were employed in its erection. It is built of white Carrara marble, in the form of a cross, with a length of 486 feet and a breadth of 287 feet. The height of the tower is 356 feet. There are 98 pinnacles and more than 2000 statues. Within it Napoleon was crowned king of Italy in 1805. The view of the Alps, Lombardy and the city from the top of the cathedral is very beautiful.

Mil'burn, WILLIAM HENRY (1823-1903), an American clergyman, born in Philadelphia and educated at Illinois College. He was a member of the Methodist Church and had circuits in Illinois and some of the Southern states. In 1865 he was ordained deacon in the Episcopal Church, but returned to the Methodists in 1871. He served several terms as chaplain of the House of Representatives and from 1893 to 1902 was chaplain of the Senate. Milburn lost

the sight of one eye when a boy and finally became blind.

Mil'dews, the name of a number of plant diseases, caused by parasitic fungi, and also powdery spots on cloth, paper, leather and other substances. In the United States there are two classes, the true, or powdery, mildews, and the false, or downy, mildews, each due to fungi of different orders. The former live on the surface of flowers, stems and leaves and send minute suckers down into the tissues, thus absorbing the nourishment and often causing the death of the plant. There are about one hundred fifty species, which attack almost every kind of plant. Downy mildews form within the tissues of the host and grow outwards, appearing on the outside only to shed the spores. The spores are one-celled, are readily blown about by the wind and spread rapidly. Some of the most injurious of plant parasites are among the downy mildews.

Mile, a measure of distance or length in the English system, now used throughout the United States and Great Britain and their possessions, and formerly in all Europe. The statute mile of England and the United States contains 320 rods, or 8 furlongs of 40 rods each, or 5280 feet. The square mile contains 640 acres. The geographical, or nautical, mile is one-sixtieth of a degree of latitude, or 6080 feet, or about 2027 yards.

Miles City, MONT., the county seat of Custer co., 383 mi. e. of Helena, on the Northern Pacific and the Chicago, Milwaukee & Pacific railroads. It is in the midst of a fertile agricultural region, has railroad shops and other industries and is one of the most important horse markets in the United States. Population in 1910, about 5000.

Miles, NELSON APPLETON (1839-), an American soldier, born at Westminster, Mass. He entered the Federal army in 1861 and was promoted through all the grades to be major general. After the Civil War he conducted several indian campaigns in the west, notably that against the Apaches under Geronimo in 1886. He succeeded to the full command of the United States army in 1895 and was in supreme control during the Spanish-American War. In 1900 he was raised to the rank of lieutenant-general and retired three years later. In 1905 he accepted a temporary appointment as commandant of the Massachusetts militia, on the staff of the governor. (See portrait on next page.)

Miletus

Mile'tus, an ancient city of Ionia in Asia Minor, at the mouth of the Maeander River. It had an extensive trade, and its manufactures of woolen goods were famous. When the Ionian colonies revolted against Persia, Miletus took a prominent part and was consequently destroyed by the Persians in 494 B.C. It was restored later to a certain extent and joined Athens against Sparta in the Peloponnesian War. Saint Paul visited the city once or twice.

Mil'ford, MASS., a town in Worcester co., 18 mi. s. e. of Worcester, on the Charles river and on the Boston & Albany and the New York, New Haven & Hartford railroads. It is



NELSON A. MILES

an important manufacturing center, producing boots, shoes, straw goods, silk, machinery and other articles. There are also extensive quarries of granite. The town has a fine high school building and a memorial hall containing the public library. It was settled in 1669 and was made a separate town in 1780. Population in 1910, 13,055.

Mil'itary Acad'emy, UNITED STATES, the national institution for the education of officers for the United States army, established at West Point, N. Y., by act of Congress in 1802. Washington, Hamilton and others who had been officers in the American army strongly advocated the establishment of such a school imme-

Military Academy

diately after the Revolutionary War, though little was done with their recommendations previous to 1802. Another act of 1808 increased the powers of the school and provided for a larger number of cadets.



UNITED STATES MILITARY ACADEMY

The corps of cadets consists of one from each congressional district, one from each territory, one from the District of Columbia, one from Porto Rico, two from each state at large and forty from the United States at large. All of these cadets must be residents of the congressional or territorial district or the District of Columbia or of the states, respectively, from which they are appointed. Appointments are made by the president of the United States, through recommendations of Congressmen, the successful candidate being selected by competitive examination. These examinations are held the first of May each year in the districts and states where vacancies occur. The candidates are required to pass an examination in English, geography, American history and the elements of mathematics, and in addition, they must undergo a very strenuous physical examination. The course requires four years. Each cadet is allowed \$500 a year and one ration a day and is prohibited from receiving any money or supplies from home or from friends.

The direct management of the academy is vested in a superintendent, who is an army officer and who has associated with him about eighty instructors, also army officers. A few of these positions are permanent, but the instructors in military science and tactics are detailed every four years by the secretary of war. The classes are divided into sections of about ten, and each cadet recites every day in the subjects which he pursues. The cadet is allowed a furlough at the end of his first two years' residence, but with this exception he does not come in contact with the outside world during his entire course. The result of all these provisions is that the American army has officers that are equal to those of any other army in the world.

Militia

The academy is beautifully situated on bluffs overlooking the Hudson River. In 1903 \$5,500,000 was appropriated for new buildings and for the remodeling of the old structures, so that the equipment is now one of the finest in the world. See WEST POINT; ARMY, subhead *United States Army*.

Militia, *mil lish'a*, a body of armed citizens, regularly trained, though not in constant service in time of peace. The term applies to the English reserve force, or *second line*, and to what is known as the *national guard*, in the United States (See ARMY). In the United States the term militia applies especially to certain organized bodies of state troops. Their number in 1912 was 125,000. In time of need they enlist under national command; but the differences of state control have led to some confusion and no little difficulty in assimilating the various bodies. Accordingly, in 1903 the United States made an attempt to influence the organization of the militia, but it could be only advisory, as the control of the militia is vested by the Constitution in the separate states. The unorganized militia consists of all able-bodied male citizens between the ages of 18 and 45 years, with certain exceptions provided by national and state laws. Their number exceeds 15,000,000.

Several of the states have organized companies of naval militia which have been given some training and which are expected to command the coast and harbor defense vessels in time of war and so release the regulars for service at sea. In 1912 there were about 7500 officers and men in the different states.

Milk, a fluid secreted by the females of mammals for nourishing their young. It is produced in quantity by sheep, goats and cows, but cows' milk is the only kind used commercially in the United States. On account of its nourishing qualities, milk is extensively used as an article of food.

When examined by the microscope, milk is seen to consist of a clear fluid containing many minute globules of fat. These are so small that about one million of them are contained in a pint of milk. They constitute the cream. One hundred pounds of good milk contain 87 pounds of water, 4 pounds of fat, 5 pounds of milk sugar, about $1\frac{3}{4}$ pounds of casein and albumen and a small quantity of mineral matter. The cream can be separated either by allowing the milk to stand for a few hours in a cool place or by the cream separator. It requires $5\frac{1}{2}$ gallons

Milk

of good milk to produce a gallon of cream, $3\frac{1}{2}$ gallons to make a pound of butter, and about $1\frac{1}{2}$ gallons to make a pound of cheese. See SEPARATOR, CREAM.

Milk is very sensitive to the influence of its surroundings, and from the moment it is drawn from the cow it begins to change. It absorbs odors from the stable, from vegetables, meats and cellars, and because of this the greatest care is necessary in keeping it free from all such influences. When drawn it should be immediately cooled to a temperature of 45° and kept at that temperature by placing it in cans set in cold water or packed in ice. In well conducted dairies all these points are given special attention, and proper apparatus for preserving the milk in the best possible condition is provided. The animals, the stable, the utensils and attendants of a dairy should be kept scrupulously clean; otherwise, however good the quality, the milk will reach the consumer in a tainted condition.

It is estimated that the quantity of milk used in the United States each day is equal to a tumbling for every man, woman and child in the country. Dairy farms in the vicinity of large cities are usually devoted to producing milk for city use, and the cows are of those breeds which will produce the largest quantity of milk without regard to its richness. The proper handling of this milk requires that it be kept cool and either bottled in the country or shipped to the city in cans which are tightly covered and packed in ice. On reaching its destination it should be bottled as quickly as possible, to exclude the air from it. The bottles should then be kept on ice until the milk is distributed for use. Dairy farms remote from cities are devoted to the manufacture of butter or cheese, and their herds are usually of those breeds which combine richness in milk with quantity.

Milk is often adulterated by adding water, by removing a part of the cream and adding water with chalk or other substances and by the addition of preservatives. For these reasons the sale of milk in large cities is usually regulated by the department of public health, which maintains inspectors who frequently test the quality of the product placed on the market by different dealers. See BUTTER; CHEESE; CREAMERY.

Milk, CONDENSED, milk preserved by partially evaporating it and sealing the product in tin cans. The milk is brought to the factory and placed in large storage tanks, from which it is drawn off into copper tanks, each having a

capacity of about 1000 gallons. The milk is brought by steam heat to a boiling point and is then drawn off and strained into the sugar mixer, where the proper proportion of granulated sugar is added. The sugar is the preservative which keeps the milk sweet under all circumstances. The milk is then taken to the vacuum pans, where it is boiled down until three-fourths of the water is evaporated. It requires a temperature of 140° to evaporate the milk in the vacuum pans, and the reduction is rapid.

The condensed milk, a thick, pasty, cream-colored custard, is drawn from the vacuum pans and taken to the coolers, from which it is taken to the packing room and put into little air-tight cans. See DAIRYING; MILK.

Milk Snake or **House Snake**, a snake common in North America, where it often enters barns and other buildings in search of mice, which constitute its principal food. Though it is quick and alert, it is entirely harmless. Its name is derived from the belief that it enters dairies and drinks the milk and even that it sucks it from cows. The snake is yellowish white beneath, somewhat darker above, its back being covered with numerous black blotches.

Milkweed, the name of a family of herbs that have curiously complicated little flowers, and whose pods are filled with flat seeds, each bearing a tuft of silky down. The plants take their name from their thick and milky juice. In the tropics some members of the family are climbers and are cultivated for their beautiful flowers. The common milkweed is found in the United States in fields and lowlands from New York west to Nebraska. The stems, which are about four feet high, are downy; the leaves are pale, and the numerous purplish flowers grow in clusters at the end of a stalk. The flowers have a sweet, sickening odor. As the plant is propagated both by its seeds and by its creeping roots, it becomes a troublesome weed, which is best eradicated by heavy cultivation. See BUTTERFLY WEED.

Milky Way or **Gal'axy**, that long, luminous track which is seen at night stretching across the heavens from horizon to horizon and which, when fully traced, is found to encompass the heavenly sphere like a girdle. This luminous appearance is occasioned by a multitude of stars, so distant and blended as to be distinguishable only by the most powerful telescopes. At one part of its course it divides into two great branches, which remain apart for a distance of

150° and then reunite. In many places smaller branches are given off. At one point it spreads out very widely, exhibiting a fan-like expanse of interlacing branches, nearly 20° broad; this terminates abruptly and leaves a kind of gap. At several points are seen dark spots in the midst of some of the brightest portions; one of the most easily distinguished of these dark spots has long been known as the "coal sack."

Mill, JAMES (1773-1836), a British philosopher and economist. He began his *History of British India* in 1806 and published it in 1818. In consequence of the knowledge which his researches had given him of Indian affairs, he was appointed assistant examiner of correspondence by the East India Company and soon afterward became chief examiner. He wrote articles on social and political subjects for the *Encyclopedia Britannica*; published a treatise on the *Elements of Political Economy*, written largely as an educational work for his son, John Stuart Mill, and an able *Analysis of the Human Mind*.

Mill, JOHN STUART (1806-1873), an English philosopher, born in London. At the age of fourteen he entered upon a course of political economy. His fifteenth year was spent in France; on his return he studied law for a time, and in 1823 he obtained a clerkship in the East India Company, remaining in the company's employment till 1858. He was elected to Parliament in 1865 as member for Westminster and used his influence on the side of the advanced Radicals. From 1835 to 1840 he was principal conductor of the *London and Westminster Review*, in which were published many of his own articles. In 1843 appeared the first of his two chief works, *A System of Logic, Ratiocinative and Inductive*, the second, *Principles of Political Economy*, appearing five years later. To these he afterward added *On Liberty*; *Utilitarianism*; the *Examination of Sir William Hamilton's Philosophy*, and a *Study of Auguste Comte and Positivism*. Mill's works on logic and political economy are standard text books.

Millais, *mil lay'*, JOHN EVERETT. Sir (1829-1896), an English painter, born at Southampton. In his earlier days he was a leader of the Pre-Raphaelite school, but on attaining maturity in art he abandoned the peculiarities for which the school is noted. He drew his subjects from all sources, using landscape, scriptural, mythological and genre themes. Among his best works are *The Huguenot Lovers*, *The Boy Princes in the Tower*, *Spring*, *Chill October*, *Ferdinand Lured by Ariel*, *Mariana in the Moated Grange*

and *Ophelia*. In portraiture Millais held first rank and painted a number of the most distinguished men of his day. He was made a member of the Royal Academy in 1883, became a baronet in 1885 and was decorated with the Legion of Honor.

Miller, CINCINNATUS HEINE (1841-1913), an American poet, better known as Joaquin Miller. He was born in Indiana, but went west with his father at an early age and spent some time in the California mining districts. For five years he lived among the Modoc Indians, and after that he attempted with little success to practice law in Idaho. In 1863 he undertook the management of the *Democratic Register*, published at Eugene, Oregon, but the paper was soon suppressed. He was called to the bar in Oregon and became district judge in Canyon City. After 1870 he lived at different times in New York, Washington and Oakland, Cal. Miller's first volume of poems, *Songs of the Sierras*, attracted considerably more notice in Europe than it did in the United States. Among his other works are *Songs of the Sun Lands*, *Songs of the Mexican Seas* and several novels. His poems show descriptive and some dramatic power, but lack true artistic form.

Miller, HUGH (1802-1856), a Scotch geologist, born at Cromarty, Scotland. While working at the trade of stone masonry, he studied literature and devoted all his spare time to geological research and to writing. Among his important works are *Old Red Sandstone*, or *New Walks in an Old Field*; *The Footprints of the Creator*, and *Testimony of the Rocks*. Miller's works have stood the test of time and are considered standard.

Miller. JOAQUIN. See MILLER, CINCINNATUS HEINE.

Mil'let, the common name for various species of grasses that produce roundish grains. The millets have been valued forage crops for centuries, and in many parts of the East they are important sources of food supplies. In India and Japan it has been estimated that more than 35,000,000 bushels of seed are planted annually. In the United States millet is raised as a forage plant and to some extent as a food for poultry. Millet is practically free from the attacks of insects and plant diseases.

Millet, *mil lay'*, JEAN FRANÇOIS (1814-1875), a French artist, born at Gruchy, near Cherbourg. He worked with his peasant father in the fields until he was eighteen years old. After this he studied drawing at Cher-

bourg and Paris, living in great poverty. It was not until he was thirty-five years old that he could do more than support himself by the sale of small pictures, but towards the end of his life he reaped the rewards of his steadfast perseverance. In 1849 he left Paris and settled among the peasants of Barbizon, on the edge of Fontainebleau Forest, and devoted himself to transferring their simple, everyday life to his canvases, which he did with great truth of sentiment and poetic charm. Of his paintings may be mentioned *The Sheep Shearers*; *The Gleaners*, probably his masterpiece; *The Sower*; *The Shepherdess with Her Flock*, and *The Angelus*. The last was sold by auction in Paris in 1889 for about \$115,000.

Mills, ROGER QUARLES (1832-1911), an American lawyer and politician, born in Todd County, Ky. He removed to Texas in 1849, studied law and was admitted to the bar at twenty years of age, beginning practice at Corsicana in 1852. He was elected to the state legislature in 1859 and entered the Confederate army, serving with distinction at Wilson's Creek, Chickamauga, Missionary Ridge and Atlanta. In 1873 he was elected to the House of Representatives as a Democrat, retaining his seat until 1892, when he was elected United States senator.

Mill Springs, BATTLE OF, a Battle of the Civil War, fought at Mill Springs, Ky., Jan. 19, 1862, between 4000 Federals, under General Thomas, and about an equal Confederate force, under General George B. Crittenden. The attack was begun by the Confederates, but after a desperate conflict they were repulsed and driven from the field. The battle was also



MILLET

Millvale

called the Battle of Fishing Creek. A national cemetery has been established on the battleground.

Millvale, PA., a borough in Allegheny co., on the Allegheny River, opposite Pittsburg, and on the Pennsylvania, the Pittsburg & Western and other railroads. It is an industrial suburb of Pittsburg and contains lumber mills, iron and steel works, breweries and other factories. Population in 1910, 7861.

Millville, N. J., a city in Cumberland co., 40 mi. s. of Philadelphia, on the Pennsylvania railroad and on the Maurice River. It is a manufacturing place, containing glass works, iron foundries, copper mills and other factories. The city has a large public park at Union Lake and contains a fine high school building and city and school libraries. It was made a town in 1801 and became a city in 1866. Population in 1910, 12,451.

Mirlo. See MELOS.

Milreis, *mil rees'*, or **Milrea**, *mil re'*, the monetary unit of Portugal and Brazil, its value in the system of the former being about \$1.08 of United States money, and in that of the latter, about 55 cents. In both cases it is divided into one thousand *reis*, and coins in multiples of both the unit and of the subdivisions are issued in both gold and silver.

Miltiades, *mil ti' a deez*, (?-500 B. C.), an Athenian general. When Greece was invaded by the Persians, he was elected one of the ten generals and drew up his army on the field of Marathon, 490 B. C., where he gained a memorable victory. In the following year he persuaded the Greeks to entrust him with a fleet of seventy vessels, in order to follow up his success. With this, to gratify a private revenge, he attacked the island of Paros, but was repulsed and dangerously wounded. On his return to Athens he was impeached and was condemned to pay a fine of fifty talents. Being unable to pay, he was thrown into prison, where he soon after died of his wound.

Mil'ton, MASS., a town in Norfolk co., 6 mi. s. of Boston, on the Neponset River and on the New York, New Haven & Hartford railroad. It is a residence suburb of Boston and contains chocolate, paper and granite works, bakeries and other factories. The town has the Milton Academy, a public library, a bank, Milton Convalescent Home and a United States meteorological bureau and observatory. It was settled in 1637 and was made a separate town in 1662. Population in 1910, 7924.

Milton

Milton, PA., a borough in Northumberland co., 67 mi. n. of Harrisburg, on the Susquehanna River and the Pennsylvania Canal and on the Pennsylvania and the Philadelphia & Reading railroads. The various industrial establishments include carriage works, rolling, flour, knitting and lumber mills, besides manufactures of woodworking machinery, furniture and other articles. It has a public park and a fine bridge across the river. The place was settled in 1768. Population in 1910, 7460.

Milton, JOHN (1608-1674), an English poet, second only to Shakespeare in rank. He was born in London. His earliest education was



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received from his father and from private tutors, but in 1620 he was sent to Saint Paul's School. There he studied ancient and modern languages, and there he became acquainted with Spencer's writings, which influenced him greatly. At the age of seventeen he entered Christ's College, Cambridge, where he remained for seven years. His *Hymn on the Nativity* was written during his university days. Leaving the university, he went to live with his father, who had retired to Horton in Buckinghamshire, and there he remained for six years. In this retreat he studied classical literature, philosophy, mathematics and music, and he wrote the four poems which are regarded as his most perfect work and as ranking with the greatest lyrics in the language. These are *L'Allegro* and *Il Penseroso*, the masque *Comus* and the elegy *Lycidas*.

Milton

In 1637, on the death of his mother, Milton made a Continental journey, in which he visited Paris, where he was introduced to Grotius; Florence, where he met Galileo; Rome, and Naples. Hearing while in Italy that civil war was threatening in England, he returned at once. The home at Horton had been broken up, and Milton settled in London, where he undertook the education of his two nephews, the sons of his sister, and the sons of a few personal friends. Before long he was drawn into the ecclesiastical struggle which was raging, and one treatise after another in defense of the Puritans came from his pen. In the summer of 1643 Milton married Mary Powell, the daughter of a royalist family, but she found his habits austere and his house dull and returned to her father about a month after marriage. In 1645, however, she returned and continued to live with him until her death in 1652.

When, in 1649, Charles I was executed and a republic established, Milton avowed his adherence to it in a pamphlet, *Tenure of Kings and Magistrates*, and was appointed foreign secretary to the commonwealth. In his literary work his eyesight suffered so much that in 1652 he became totally blind. Nevertheless, he continued Latin secretary, with the assistance of Andrew Marvell, and dictated some of Cromwell's most important dispatches. When Charles II was restored a few months later, the blind politician remained in hiding, his books were burned by the common hangman and he himself narrowly escaped the scaffold. He had married a second wife in 1656, who died in 1658, and in 1663 he married a third time. The last years of his life were spent in seclusion, in the composition of his greatest work, *Paradise Lost*. Blind as he was, his daughters were called on to read to him and to take down his verses, and they accepted the task in no pleasant spirit. They were disrespectful to him, sold his books by stealth and grumbled over his third marriage. Above all these troubles, however, Milton rose triumphant, and his great epic contains many passages which have never been surpassed in English poetry. *Paradise Lost* was published in 1667, *Paradise Regained* and *Samson Agonistes*, a tragedy, in 1671. Besides these works, Milton wrote a number of beautiful sonnets, the one *On His Blindness*, perhaps, the best-known of all English sonnets. His prose writings, though elegant in style, are often violent in tone, and they have, moreover, little of interest in the present day. *Areopagitica*, a defense of

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the freedom of the press, is the best of his prose writings.

Milwau'kee, Wis., the county-seat of Milwaukee co. and the chief city of Wisconsin, is a port of entry situated on Lake Michigan, 85 mi. n. of Chicago and 83 mi. e. of Madison, the capital of the state. The abrupt shores of the lake at this point are from 80 to 125 feet high and are cut by the Milwaukee River, which forms a part of the splendid harbor. The Menominee and the Kinnickinnic, two small streams which flow into the Milwaukee River within the city limits, aid in making the location more picturesque. All these natural advantages have been considered in the building of the city, and the result is that Milwaukee has become one of the handsomest cities of the northwest. Its shape is that of an irregular rectangle, and it covers about 26 square miles. The plan is quite regular, the streets are broad and many miles of them are finely paved and laid with asphalt. The business part of the city is near the lake, while the best residence sections crown the hills and ridges and follow the lake shore northward. A system of electric railways affords communication between all parts of the city and two other systems extend into the suburbs and to resorts along the lake and in the interior of the state. Five great viaducts span the valleys, and the rivers are well bridged. The Chicago, Milwaukee & Saint Paul, the Chicago & Northwestern and the Soo railroads have lines extending into the city, and the first two have fine depots. The Pere Marquette and Grand Trunk have boat connection with the city.

Lake Park, which contains about 124 acres, is laid out with drives and walks. It is located in the northeast part of the city, on the lake shore. Juneau Park, a small tract on the lake front, contains a statue of Leif Ericson and another of Solomon Juneau, the founder of the city. Washington Park, on the west side, contains about 150 acres, and the eight or ten smaller parks here and there in the city bring the total park area to about 950 acres. Milwaukee has a number of fine buildings, and the general appearance of the city is neat and attractive. The Milwaukee brick, which have been widely used, are famous everywhere for their light cream color. Among the public buildings are the United States government building, the public library, the Layton Art Gallery, the last a gift from one of Milwaukee's public-spirited citizens; the auditorium, county courthouse and city hall.

Milwaukee has an excellent public school system, with four large high schools, besides numerous private institutions, including Concordia College, Marquette University and the Milwaukee-Downer College for women. It is also the seat of a state normal school and has one medical college, affiliated with Marquette University. The state industrial home for girls is located in the city, and a mile west of its limit is a national soldiers' home, on grounds covering about 400 acres.

Milwaukee's excellent harbor, which is now protected by a breakwater two miles long, has been instrumental in creating the extensive commerce which the city now enjoys, as an important collecting and distributing center for the northwest. Milwaukee receives its coal by way of the lakes from the east, and large quantities of iron ore are shipped in from the north. The manufacturing interests of the city are large in proportion to its population. The chief manufactures, in the order of their importance, are metal, clothing, leather and beer. In 1913 the value of the products was over \$420,000,000, and the total wholesale business was over \$500,000,000. The chief officer of the city is the mayor, who is chosen by the electors, as are the treasurer, controller, attorney and a common council, consisting of one alderman from each ward and twelve aldermen at large. Various boards transact the city business. If any board consists of more than four members, it is required by law to represent two political parties.

HISTORY. In 1818 Solomon Juneau built a little log cabin on the east side of the Milwaukee River, and this is considered the first permanent settlement of Milwaukee, although trading posts had been established there before and Jesuit priests had located in the vicinity. A village of Pottawatomi indians, was then in existence at this point. The region around Juneau's house was known as Juneautown. The west side of the river, which was settled by Byron Kilbourn in 1734, was called Kilbourn-town, and the region south of the Menominee River was called Walker's Point, for George H. Walker, who settled there in the same year. For a long time there was bitter rivalry among the three villages, but this gradually died out, and Juneautown was organized as the village of Milwaukee in 1837. Two years later Kilbourn-town was annexed, and in 1845 Walker's Point was joined, and the three settlements were incorporated as the city of Milwaukee. Solomon Juneau was chosen the first mayor.

POPULATION. The population of Milwaukee in 1910 was 373,857. It is a mixed population, in which for many years people of German birth largely predominated; in fact, for many years German customs were more in evidence than those of America. During the Civil War a company was formed composed wholly of German turners. More recently Poles, Italians, Russians, Dutch, Scandinavians, Bohemians and other peoples have colonized different parts of the town, and although certain wards still remain solidly German, a majority of the inhabitants are of non-German descent.

Mim'icry, the name given to that condition or phenomenon which consists in certain plants and animals exhibiting a wonderful resemblance to certain other plants or animals, or to the natural objects in the midst of which they live. This peculiar characteristic is generally the chief means of protection of the animal against its enemies. It is well seen in the leaf insects and in the walking-stick insects. Certain tropical butterflies reproduce the appearance of leaves so closely that even the parasitic fungi which grow upon the leaves are imitated. Some caterpillars resemble the twigs of trees and when alarmed stand rigidly out from the branch to increase the likeness. A few flies, whose larvae are parasitic on bees, by closely resembling their host are able to enter the hives and deposit their eggs. A South American moth has a most accurate resemblance to a humming bird; while the cacti of America and the euphorbias of Africa might easily be mistaken for each other, though widely different in structural character. The theoretical explanation of this quality is attributed by recent biologists to purposes of self-preservation.

Min'aret, the tower of a mosque. A mosque has one or more minarets, often as many as four, one at each angle of the enclosure; one mosque, that at Mecca, has seven. The minaret is generally a slender, polygonal or cylindrical shaft of brick or stone. It has several stories, with projecting balconies from which the muezzin calls the people to prayer. It terminates in a tapering cone, crowned by a pinnacle or small dome, and is ascended by a narrow, spiral staircase. Many examples are found in the architecture of the thirteenth and sixteenth centuries in Egypt, Spain, Syria, India and Turkey. See **Mosque**.

Mi'nas Bay or **Basin of Minas**, the name given to the eastern arm of the Bay of Fundy. It extends for 60 miles into Nova Scotia. The



PROTECTIVE MIMICRY—INSECTS

1, Harmless Brazilian insect resembling a wasp.
2, 3 and 4, Butterflies resembling leaves.
5, South American leaf insect.

6, Moth resembling spot on leaf.
7, Measuring worm that when frightened resembles a dead twig.
8, Brazilian bug resembling bark.

9 and 10, A fly and an offensive beetle.
11, Cocoon resembling broken twig.
12, A harmless fly.

13, Beetle resembling caterpillar distasteful to birds.
14, Bee's Nest.
15, Cocoon.
16, Walking Stick.

tides in the basin are very strong and have been known to reach the height of 60 or 70 feet. The principal river which empties into the bay is called the Avon. The village of Grand Pré, celebrated in Longfellow's *Evangeline*, is situated on the Bay of Minas.

Mind, the sum of the powers of knowing, feeling and willing, the entire spiritual nature, or the soul. From Aristotle to modern philosophers, many theories as to what mind is, have been advanced, and their elaboration and discussion have presented some of the most difficult problems of metaphysics. The early theories consider the mind as separate from the body, but later theories recognize the intimate relation between mind and body. The study of physiological psychology has shown that mental action is based upon certain physiological conditions. Many psychologists use mind and soul as synonymous terms, while others consider mind the more comprehensive term and restrict the term *soul* to include those activities especially connected with the religious nature.

Mindanao, *meen da nah' o*. See PHILIPPINE ISLANDS.

Mindo'ro. See PHILIPPINE ISLANDS.

Mineralogy, *min ur al' o jy*, the science which treats of minerals. It includes the study of all inorganic substances in the earth and on its surface. As distinguished from geology, mineralogy deals with the various mineral bodies as separate substances forming the earth's crust and examines their properties as such, while geology treats them together as building up the crust of the earth. Mineralogy is closely related to chemistry, since without a knowledge of this branch of science, it would be impossible to determine the composition of minerals.

Minerals are classified according to their structure, their chemical composition and their physical conditions. In structure solid minerals are either *crystalline* or *massive*. When crystalline, they conform to some system of crystallization (See CRYSTALLOGRAPHY). The study of the crystals of minerals is very important, since each substance always crystallizes in the same form, and by learning the angles or number of sides of crystals, the composition of the mineral can very largely be determined. Another important test in the classification of minerals is *hardness*. In accordance with this quality, minerals are classified according to numbers, from 1 to 10. Beginning with the softest, they occur in the following order: 1, talc; 2, selenite; 3, calcite; 4, fluorite; 5, apatite;

6, feldspar; 7, quartz; 8, topaz; 9, corundum; 10, diamond. A mineral which ranks in hardness between any two successive numbers on the scale, as between 5 and 6, has its degree of hardness indicated by a fraction, as 5.5. The electrical condition of minerals is also considered in determining their classification. This can be found by subjecting them to the influence of an electric current. Consult E. S. Dana's *Minerals and How to Study Them* and J. D. Dana's *System of Mineralogy*.

Min'eral Oil. See PETROLEUM.

Mineral Waters, the term commonly, but somewhat erroneously, applied to the spring waters that contain an unusual quantity of such substances as sodium, magnesia, iron, carbonic acid and sulphur. It has not been found practical or useful to classify mineral waters under their chemical elements, but the attempt has been made, springs being described as salt, earthy, sulphur, iron, alkaline or alkaline-saline. Besides the substances which these terms indicate, the waters are frequently impregnated with carbonic acid gas.

Mineral Wool, a substance which is produced from the glassy liquid slag of the blast furnace, drawn out into fine fibers under pressure of steam. The slag, when in a molten condition, is driven by the steam from the furnace through a crescent-shaped aperture and suddenly cools into long, fibrous filaments. The thin, glassy, thread-like substance thus produced is useful as a non-conductor of heat, and it has, therefore, been largely employed as a covering for boilers and steam pipes and to protect water pipes from frost.

Minerva, *min ur' va*, (known by the Greeks as Athene), in classical mythology, the goddess of the intellectual powers, the daughter of Jupiter and Metis. According to popular legend, before her birth Jupiter swallowed her mother, and Minerva afterwards sprang from the head of Jupiter. Whatever other qualities she might possess, and these were many, she was always the symbol of the thinking faculty, the goddess of wisdom, science and art; but she was also a skilled warrior and the protector of warriors and is therefore usually represented completely armed, her head covered with a gilt helmet. At times, however, as the goddess of the peaceful arts, she appeared in the dress of a Grecian matron. Her distinctive symbols were the aegis and the gorgon's head, and the olive tree was sacred to her. Athens, which was named after her, was the city in Greece most sacred

to her, while at Rome, also, she had several temples.

Mining. In its broadest meaning, mining comprehends all the processes whereby the useful minerals are obtained from their natural localities beneath the surface of the earth, together with the subsequent operations by which many of them must be prepared for the purposes of the metallurgist. As the term is now generally used, it means the art of obtaining



MINERVA

the ores from the earth, while the processes connected with separating the metals from their ores are included under *metallurgy*. Mining has been practiced from the remotest times. It is referred to in the twenty-eighth chapter of the book of *Job*, and an Egyptian papyrus, drawn in 1400 B. C., preserved in the museum at Iuvén illustrates the workings of a gold mine.

All mineral deposits are divided into two very broad divisions. The first includes the beds, or seams, of iron ore, coal and salt. These are deposits laid out more or less horizontally and parallel to the stratification of the surrounding rocks. The second class includes mineral

veins, or lodes. The mining appliances employed are very different in the two classes of deposits. In the first class, it is desirable to make a hole of the shortest possible depth from the surface of the ground to the bed of mineral. A shaft is therefore sunk through valueless beds until the mineral is reached. Machinery of the best class is then used to extract the whole of the mineral, due precautions being taken to avoid danger from falls of roof and from noxious gases. In the second class of deposits, the inclination of the mineral vein has to be taken into account, as the deposit varies considerably in inclination and in size. The vein must therefore be studied foot by foot, downward from the top. In some cases a vertical shaft is sunk, and passages, known as *cross-cuts*, or *levels*, are driven from this to the vein at different depths. A vertical shaft presents the advantages of greater ease in sinking, hauling and pumping. In the search for mineral deposits, the best evidence is obtained by putting down bore holes. These are made by various methods and are sent to a depth of a few feet, when required for testing the character of the foundation subsoil, or, in other cases, to thousands of feet, when required in seeking for or estimating the value of deposits of coal, salt and iron.

In order to open up a mine, tunnels, or entries, are driven into the lode or bed whenever the contour of the country admits of this scheme. Shaft sinking involves a larger outlay of capital and greater working cost. In the ordinary method of sinking shafts, the workmen, standing upon the bottom of the pit, blast out the rock and send the excavated material to the surface by means of an engine, rope and bucket. The sides of the shaft are supported by timbering or walling. By the use of steam power for operating the hoisting apparatus, shafts can be sunk to almost any depth desired. The deepest shaft in the world is at the Calumet and Hecla copper mine, Calumet, Mich. It exceeds 5000 feet. The cutting of a path through the harder rocks, as carried on by the ancient miners, was particularly laborious. Previous to the introduction of blasting, the implements used were of the nature of wedges and hammers. Bit by bit pieces of rock were broken away, the operation being aided by natural fissures in the rock and by the brittleness of the hard material. In this way the ancient miners cut coffin-shaped galleries 6 feet in height. At the present time the galleries, or levels, are usually $7\frac{1}{2}$ feet high and 5 feet wide, thus affording greater facility for

traveling and for ventilation. In the operation of blasting, use is made of a drill of steel. This may be struck with a hammer, but wherever possible rock drills driven by steam, compressed air or electricity are in use. The bore hole, when finished, is then charged. Gunpowder, compressed powder, dynamite and gun cotton are employed. Nitrated guncotton has also given admirable results. The fullest benefit of these modern explosives can be obtained only by the use of strong charges fired by electricity, by which it is possible to place a number of bore holes in such a manner that when fired together they shall help one another. For removing coal, these high explosives are too quick in their action, and blasting powder continues to be used.

COAL MINING. Coal is usually found in horizontal layers, except in the anthracite regions, where some veins are in an oblique position. Such veins are often mined by excavating a gallery into the side of the hill, but most coal mines are entered through a vertical shaft, which is sunk to the bottom of the first workable vein. This shaft is rectangular in shape, usually 30 feet long and 8 to 10 feet wide. It is divided into four sections, in two of which the hoisting cages operate. Of the others, one is generally used for ventilation and the other for conveying pipes for pumping and electric wires. This division also has a stairway or system of ladders, which may be used in case the hoisting machinery is injured. From the foot of this shaft a gallery is excavated in opposite directions. If the vein of coal is deep enough to admit of working without the removal of rock, little or no rock is disturbed; otherwise, enough rock has to be excavated to enable the miners and tramcars to pass through the gallery. From this main gallery, other galleries are excavated at frequent intervals, running at right angles to the main gallery, and from each of these are still smaller galleries, leading into the vein of coal. The roof of the mine may be supported in one of two ways—by leaving pillars of coal at frequent intervals, or by the use of timbers. In a mine free from obstructions, the arrangement of galleries resembles very closely that of the streets in a well-planned city.

Tramways are laid in the main gallery and those leading off from it. Upon these, cars are hauled by mules or, in very large mines, by electric power, to the foot of the shaft, whence they are run upon the hoisting cages and elevated to the surface, where they are unloaded

by dumping. In some of the coal measures, the shaft is sunk until it cuts a number of veins of coal, and in this case cars are hoisted from different levels; but in the bituminous fields it is not customary to work more than one vein at a time.

Because of the formation of gases (See **FIRE DAMP**), coal mines need to be more thoroughly ventilated than other mines. The ventilation is provided either by means of a fan at the foot of the shaft, to draw air from a fresh air shaft at another part of the mine, or by a fan on the surface, which forces the air in through a shaft constructed for that purpose. By the use of partitions the direction of the air current is controlled so that every part of the mine is ventilated. The portions newly opened are usually more dangerous than the others, for it is in these that the gases are liable to collect.

Min'isters, **FOREIGN**, those accredited representatives that one country sends to another. They are divided into three classes. The highest in rank is the *ambassador extraordinary*, who can claim to represent his state or sovereign in his own person, and who receives honors and enjoys privileges accordingly. The *legates* and *nuncios* of the pope also belong to this class. *Envoys extraordinary*, *internuncios* and *ministers plenipotentiary* belong to the second class, and they do not hold the same degree of power nor receive the same distinction as the former. The third class includes *ministers resident*, *envoys* and *charges d'affaires*. Persons who are sent merely to conduct the private affairs of their monarch or his subjects in a foreign place are called *agents* or *residents*; when occupied chiefly with matters of a commercial character, they are called *consuls*.

Min'istry, the name sometimes given to the heads of the executive departments of a government, taken collectively. It is usually synonymous with the term *cabinet*, though in some countries, as in Great Britain, the ministry includes, besides the cabinet, many under-secretaries of departments, who have seats in Parliament. See **CABINET**.

Mink, a mammal of the weasel family, allied to the polecat. It burrows on the banks of rivers and ponds and lives on frogs, crayfishes and fishes, which it pursues in the water. It emits a strong and disagreeable odor; its fur is in considerable demand. The American mink, found especially in the north, is about a foot and a half long, has small ears and eyes and is covered with a coat of rich brown fur.

The European species is smaller than the American and has beautiful brown fur which is more valuable.

Minneapolis, the "Flour City," or the "City of Lakes and Gardens," county-seat of Hennepin co., Minn., on the Mississippi River, 420 mi. n. w. of Chicago and 581 mi. n. of Saint Louis, upon the Great Northern, the Northern Pacific, the Chicago, Burlington & Quincy, the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul, the Chicago Great Western, the Minneapolis & Saint Louis, the Minneapolis, Saint Paul & Sault Ste. Marie and the Chicago, Rock Island & Pacific railroads.

Minneapolis covers an area of a little over 53 square miles, extending on both banks of the Mississippi for nearly 10 miles and having an extreme east and west extent of about 6 miles. On the south it borders upon Saint Paul. The river divides the city into two unequal divisions, known as the East Division and the West Division. Below the Falls of Saint Anthony, which are in the heart of the city, the Mississippi flows through a deep gorge, and within the city limits the river is spanned by nineteen bridges. The city is built upon nearly level ground and is regularly laid out, most of the streets running at right angles. Both the East and West divisions are divided into north and south sections. The West Division, which is by far the larger, is divided by Hennepin Avenue, and the East Division, by Central Avenue and Division Street. The streets from these dividing lines are numbered in their order, and those running parallel with the river are also numbered. The east and west streets are styled *avenues*, while the north and south thoroughfares are named *streets*. Hennepin Avenue, Nicollet Avenue, Marquette Avenue and Second Avenue, South, are the chief business streets for retail purposes. The wholesale and manufacturing districts are located on both banks of the river and extend as far as the city limits.

Minneapolis has an attractive system of parks and boulevards, which begins with Loring Park, in the center of the city, and includes the parks to the southwest, in which are situated lakes Calhoun, Harriet and Cedar and Lake of the Isles, all beautiful sheets of water. Connecting all of these lakes is a boulevard, which continues to the south and east until it reaches the river at Minnehaha Park, in which are located Minnehaha Falls. From Minnehaha Park the boulevard continues along to the University campus. One-tenth of the entire area of the city is devoted

to park purposes. A law which provides that property once acquired for parks may never be used for any other purpose has permitted permanent improvements on a large scale. The city, in connection with Saint Paul, has one of the finest systems of street railways in the country, the system covering both cities under one management.

The city is well built and contains a number of public buildings and business blocks which equal in their architectural features and construction those found in any other city in America. Foremost among these is the county courthouse and city hall, erected by the county and city at a cost of about \$3,500,000. This structure occupies an entire block. It is built of Ortonville granite and is finished in marble. It has a tower 350 feet high, in the upper story of which is an observatory, from which an excellent view of the city can be obtained. Among other buildings worthy of mention are the Minneapolis Art Museum; the Auditorium, with a seating capacity of over 2500; the Plymouth, First National-Soo, McKnight and Security Bank buildings; the Masonic Temple; the Lumber Exchange; the public library, containing 225,000 volumes; the Metropolitan Life Building; the New York Life Building; the Chamber of Commerce; the Radisson, Dyckman, Leamington, Andrews and West hotels. The city is also noted for its large and beautiful churches. The most important among these are the Roman Catholic Pro-Cathedral, St. Marks, Second Church of Christ-Scientist, Wesley Methodist, Plymouth Congregationalist, Park Avenue Congregationalist, Westminster Presbyterian, First Unitarian and the Church of the Redeemer, Universalist. The buildings of the University of Minnesota are noteworthy.

Minneapolis is an important manufacturing and commercial center. It has long been known as the largest center of the manufacture of flour in the world, and its combined mills now have a capacity of nearly 85,000 barrels in twenty-four hours. These mills are situated on both banks of the Mississippi, at the head of the Falls of Saint Anthony. Next in importance to the manufacture of flour is the manufacture of machinery, with lumber third. Other industries of importance are the manufacture of lumber and timber products, such as furniture, boxes and the like; cooperage, for which the manufacture of flour creates a large demand; the manufacture of underwear and other knit goods, fur goods, foundry and machine shop products and malt

liquors, the manufacture and repair of railway cars and the manufacture of small wares.

As a primary wheat market Minneapolis is the most important in the country. Besides the lumber manufactured in the city, Minneapolis is also an exchange point for large quantities of lumber manufactured in other places and forwarded for sale. The city also contains many excellent wholesale and retail stores.

Minneapolis is a healthful city. The Federal authorities report that for the year 1914 it was the most healthful city of more than 300,000 population, in America, with a death rate of 11.66 per thousand of population. The city was settled in 1854. The great water power furnished by the Falls of Saint Anthony soon made it an important manufacturing center. It was incorporated as a town in 1856 and became a city in 1867. Population in 1910, 301,408.

Minneso'ta, the GOPHER STATE, situated in the north central part of the United States and in the geographical center of North America, half-way between the line of perpetual frost on the north and the line of no frost on the south. It is bounded on the n. by Manitoba and Ontario, on the e. by Lake Superior and Wisconsin, on the s. by Iowa and on the w. by the Dakotas. The eastern portion of the northern boundary consists of a chain of lakes and rivers, of which the Rainy River and Lake of the Woods are the most important. The eastern boundary is formed almost entirely by Lake Superior and the Saint Croix and Mississippi rivers, and a large portion of the western boundary is formed by the Red River of the North. The greatest length from north to south is about 400 miles, from east to west, 380 miles, and its average width is 240 miles. The area is 84,682 square miles, of which 3824 square miles are water, not including Lake Superior. Population in 1910, 2,075,708.

SURFACE AND DRAINAGE. Notwithstanding its large area, Minnesota contains no lofty mountains nor deep valleys. A height of land with an elevation of about 1700 feet extends in an irregular line approximately east and west through the north central portion of the state. From its slopes, rivers flow in all directions. The highest land is in the Mesaba range, in the northeastern section, where the loftiest summits are about 2200 feet. The region around Lake Superior is the lowest, having an altitude of about 600 feet. From this low land southward and westward to the valley of the Red River of the North, the surface consists largely of rolling

land, interspersed with streams and lakes and covered with pine or hardwood forests. Along the Mississippi are high bluffs, which in the southeastern portion of the state reach an altitude of nearly 1800 feet. The southern tiers of counties are largely rolling prairies, which merge into the high parallel swells in the southwest, sometimes known as *coteaus*, and designated by Longfellow in his *Hiawatha* as "mountains of the prairie." The valley of the Red River of the North, which includes the northwestern counties, is level.

The drainage includes three river systems. A small section of the northeastern corner of the state drains through the Saint Louis and a number of short rivers into Lake Superior. North of the height of land the rivers flow into the Rainy River and the chain of lakes which connect with the Hudson Bay system. The central and southern portions of the state, including more than one-half of its area, are drained into the Mississippi. The most important tributary of this stream within the state is the Minnesota, which flows in a southeasterly, then northeasterly direction entirely across the state. The northwestern section is drained into the Red River of the North, whose tributaries are few, only one, the Red Lake River, being of any importance.

Minnesota contains over 6000 lakes. The largest one that lies wholly within the state is Red Lake. Of the Lake of the Woods, on the northern boundary, only a small portion belongs to Minnesota. What is known as the lake region extends southward through the central part of the state and contains thousands of small lakes surrounded by timber, noted for the beauty of their scenery, the clearness of their water and the abundance of fish. Many of these are popular summer resorts. On the western boundary are lakes Traverse and Big Stone, the former the source of the Bois de Sioux, and the latter the source of the Minnesota.

CLIMATE. The climate of Minnesota is cool temperate. The summers are characterized by many hot days, followed by cool nights. The thermometer rises to 90°, or even 100°, during July and August. The autumns are remarkably mild and pleasant, frosts seldom occurring before the middle of October. The winters are characterized by clear, cold weather, in which the temperature sometimes falls as low as 40° below zero. The springs are short, the transition from winter to summer being quite rapid. The atmosphere is dry and clear, and the

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extremes of temperature are therefore not noticed as much as they are in regions of less variation but of greater humidity. The rainfall for the entire state is about 24 inches. It is heaviest in the eastern half and lightest along the western border, but everywhere it is sufficient for agricultural purposes and is evenly distributed throughout the year.

MINERAL RESOURCES. Minnesota is the leading state in the Union in the production of iron ore and contains what are probably the largest iron mines in the world. These are located in the Mesaba and Vermilion ranges, near the head of Lake Superior (See IRON). The ore is shipped by rail to Duluth and Two Harbors, and thence it goes by boat to the various points on the Great Lakes, where it is smelted. There are valuable granite quarries at Saint Cloud and Ortonville, on Big Stone Lake. A pink limestone of great value as a building stone is found in Blue Earth and Lesueur counties, in the southern part of the state; a cream-colored limestone is quarried at Red Wing, and a dolomite rock is found near Rochester. A brown sandstone is also found near Sandstone, and in Pipestone County, in the southwestern part of the state, are extensive quarries of red jasper, especially valuable for building and ornamental purposes. At the foot of this quarry is also found the famous deposit of pipestone used for so many centuries by the Indians in making peace pipes. So far as known, this is the only important deposit of this rock in the country. Slate occurs in the northern part of the state, and brick clay is quite generally distributed.

AGRICULTURE. Minnesota is one of the leading agricultural states and produces large quantities of the best quality of spring wheat, the entire valley of the Red River of the North being especially suited to the production of this grain. Wheat is also grown on much of the tillable land in other parts of the state, so that the entire output is large. Other crops of importance are oats, corn, barley, rye and potatoes. Hay is raised in large quantities, and dairying and the raising of live stock are important branches of agricultural industry. In the southern part of the state the more hardy varieties of apples, strawberries and other small fruits are grown successfully, though fruit growing is not an important agricultural industry. On the new lands flax is raised for the seed, which is used in the manufacture of linseed oil. The fiber to some extent is shipped to manufacturers.

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MANUFACTURES. Minnesota has an abundance of water power, and the presence of extensive forests and excellent shipping facilities have combined to develop her manufactures more rapidly than these industries have been developed in other states as far west. Minneapolis, Saint Paul and Stillwater are the leading manufacturing centers. The most important of the industries is the manufacture of flour and grist mill products, in which Minneapolis leads the world. Next in importance is lumber. There are over 50,000 square miles of forest land in the state. The northern part of the state contains the largest forests of white pine found within the Union, and south of these are forests of hard wood, while in various localities are found Norway pine and spruce. The great lumber centers are Minneapolis, Cloquet, Stillwater, Brainerd and Little Falls, where logs are not only manufactured into lumber, but made into furniture, finishing for interiors and other articles of wood.

TRANSPORTATION AND COMMERCE. The state has the advantage of two important water routes; the Mississippi and the Great Lakes. The multiplication of railways has rendered the Mississippi of less importance than formerly, but the importance of the lake route grows with the development of the country. Duluth, at the head of Lake Superior, has now become one of the important shipping points of the country. The Northern Pacific, Great Northern and Minneapolis, Saint Paul & Sault Ste. Marie railways have lines extending across the northern and central parts of the state and lines from Saint Paul and Minneapolis connecting therewith. The Chicago, Milwaukee & Saint Paul road has a line extending across the southern part of the state and also a line from Minneapolis and Saint Paul across the south central part of the state, forming a part of its coast line, while the Northwestern system maintains a line between the two last mentioned. The Minneapolis & Saint Louis Railway maintains a line from the Twin Cities southwesterly to Omaha and another line westerly across the state and to the Missouri River. These, with the numerous cross lines, now give the state ample railway facilities, with the exception of the far northern counties, which are still sparsely settled. Saint Paul and Minneapolis jointly form the great railway center, not only of Minnesota, but of the northern part of the Mississippi Valley, having alike 23 lines of diverging railways, operated under 9 great railway systems.

The commerce of the state consists of the exportation of her surplus products and the importation of such articles as are not raised or manufactured within her borders. Minnesota is the leading state in the production of spring wheat, flour and iron ore, and these products are shipped in large quantities, the flour going to Europe as well as American markets. Next in importance are lumber and lumber products, which are generally distributed over the surrounding states. Considerable lumber is also transported down the Great Lakes from Duluth and other ports on Lake Superior, and thus finds its way to eastern markets. Linseed oil and mineral water are also important articles of export. The single item of importation largest in value is coal, most of which is brought to Duluth by boat, from whence it is distributed by the various lines of railway terminating at that port. Manufactured articles constitute most of the other imports. Saint Paul and Minneapolis are an important distributing point for the state to the West, and the former has a large wholesale trade. These conditions give Minnesota an extensive commerce.

GOVERNMENT. The legislature consists of a senate of 63 members, elected for four years, and a house of representatives of 119 members, elected for two years. The sessions are biennial and are restricted to ninety days. The executive department of the government consists of a governor, a lieutenant governor, a secretary of state, a treasurer and an attorney-general, elected for two years, and an auditor, elected for four years. The judiciary department consists of a supreme court of five judges, elected by the voters of the state, and of district courts, presided over by judges elected for six years. Each county maintains a probate court, and townships have justices of the peace.

EDUCATION. The system of public schools is based upon the district plan, but is unified much more thoroughly than in most other states. At the head of the system is the University of Minnesota, at Minneapolis, which has organic connection with all of the high schools and through a system of examinations provides for the admission of graduates of these schools to the university. There is also an organic connection between the high schools and the graded schools and the ungraded schools of the rural communities. The state superintendent of public instruction is at the head of the educational system, and the schools of each county are under the supervision of a county

superintendent. The school fund derived from the sale of school lands is very large and is constantly growing. In addition to the aid received from this fund, each high school maintaining a course of study which prepares for admission to the university receives from the state an annual appropriation of \$1000. Graded schools and country schools under certain conditions also receive direct state aid. In connection with the school system is a system of public libraries, which provides libraries for all school districts that are willing to assume a portion of the expense. A thorough system of traveling libraries is also maintained. There are state normal schools at Winona, Mankato, Saint Cloud, Moorhead and Duluth. Other important institutions of learning, maintained by various denominations, are Carlton College at Northfield, Hamlin University at Hamlin, Macalester College at Saint Paul, Gustavus Adolphus College at Saint Peter and the Shattuck School at Faribault. There are also a number of large parochial schools and colleges in the state, under the management of the Roman Catholic Church.

INSTITUTIONS. The hospitals for the insane are at Rochester, Saint Peter, Fergus Falls, Anoka and Hastings; the schools for the deaf, the blind and the feeble-minded are at Faribault, and the State Public School for dependent children is at Owatonna. The penal institutions are the penitentiary at Stillwater, the reformatory at Saint Cloud and a training school at Red Wing.

CITIES. The chief cities are Saint Paul, the capital; Minneapolis, Duluth, Winona, Stillwater, Mankato and Saint Cloud, each of which is described under its title.

HISTORY. The territory of Minnesota was first visited in 1678 by a Frenchman, Duluth, who built a fort at the site of the city which now bears his name. Hennepin discovered the Falls of Saint Anthony two years later, and within two decades settlement had begun in earnest. The region was ceded to Great Britain in 1763, was ceded to Spain in 1783, was retroceded to France in 1800 and was obtained by the United States through the Louisiana Purchase in 1803. The first permanent American settlement was a military post, Fort Snelling, established in 1819, but immigration and occupation practically began only after the treaty with the Dakotas in 1837, by which all of the indian lands east of the Mississippi were ceded. In 1849 Minnesota became a territory, and it was admitted into the Union in 1858. The development of the state was retarded by Sioux depredations,

which culminated in a great massacre in 1862. When these conditions passed and a system of railways opened up the state, rapid growth was possible. The most important issue after the Civil War was the question of redeeming or repudiating bonds which had been issued to promote railway construction. A compromise was reached in 1881. The state has been almost steadily Republican in politics. Consult Folwell's *Minnesota*, in the American Commonwealths Series.

Minnesota, UNIVERSITY OF, a state university, located at Minneapolis and established by an act of the territorial legislature in 1851. It was not opened for instruction, however, until 1869. The present organization includes the college of liberal arts, embracing science and literature; the college of engineering and mechanic arts, the college of agriculture, the college of law, the college of medicine and surgery, the college of homeopathic medicine and surgery, the college of dentistry, the college of pharmacy, the school of mines, the school of chemistry, the school of agriculture and a graduate department. The management of the university is vested in a board of trustees, of which the governor, the superintendent of public instruction and the president of the University are members *ex officio*. There are about 500 professors and instructors on the faculty, and the enrollment is nearly 7000. The institution is co-educational, and over one-third of its students are women. The university is at the head of the public school system and maintains a thorough supervision over the high schools of the state by a system of inspection and examinations. Graduates of all accredited high schools are admitted to the undergraduate departments without examination. Dr. Geo. E. Vincent is president.

Minnesota River, a river in the United States which rises in Big Stone Lake, flows through Minnesota and falls into the Mississippi about seven miles above Saint Paul. Its length is about 475 miles, and it is navigable for small steamboats for about fifty miles.

Min'newit, PETER. See MINUIT, PETER.

Min'now, a popular name for any small fish. The roach, the golden shiner, the killifish and the mummichog are some of the fishes generally called minnows. They are the natural food of many larger fish and are generally used as bait for them.

Mi'nor. See INFANT.

Minor'ca, an island in the Mediterranean Sea, the second largest of the Balearic group. It

belongs to Spain. Its area is 293 square miles. The coast is irregular and for the most part steep and cliffy. The soil is not generally fertile, though considerable quantities of wheat, oil, wine, hemp, flax, oranges and lemons are produced. Iron, copper, lead and marble are plentiful. Population in 1910, estimated, 40,000.

Minor Prophets, THE, so called from the brevity of their writings, are twelve in number, namely, Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Zephaniah, Haggai, Zechariah and Malachi. Their prophecies are found in the Hebrew canon.

Mi'nos, in Greek legend, a king of Crete, the son of Zeus and Europa. According to one version of the legend he was a wise ruler who, after his death, was made a judge in the lower world. Other versions give less favorable accounts of his character and tell of his demanding from Athens young men and girls to be fed to the frightful Minotaur. See MINOTAUR.

Min'otaur, in Greek mythology, a monster with the body of a man and the head of a bull, which fed on human flesh. Minos, king of Crete, kept this monster shut up in a vast labyrinth and fed him on youths and maidens who were sent each year from Athens as a tribute. Theseus killed the minotaur and freed Athens from the terrible curse. See THESEUS.

Minsk, a town of Russia, capital of the government of the same name, on the Svislotch, 430 mi. s. w. of Petrograd. It is the seat of a Greek archbishop and of a Roman Catholic bishop, and contains two castles. It has some manufactures, among which are leather, tobacco and agricultural implements, and it enjoys a considerable general trade. Population in 1910, 101,166.

Min'strel, the name applied to a class of poet musicians who flourished at different times in the Middle Ages and afterward. The first minstrels were men who wandered from place to place exhibiting their talent in poetry and music by composing and reciting verses commemorating heroes and heroic deeds. These verses were often set to simple music and sung to the accompaniment of the harp. The name is now given to a class of players who combine music, comedy, juggling and pantomime and other simple forms of entertainment.

Mint, the building and equipment used in the making of coins. The first mint was established in England and was managed by a local officer called the reeve, corresponding to the sheriff in the American county. In later times

not only the king, but nobles and bishops, coined money. More recently, however, the privilege of coining has been conceded to the sovereigns, and in all modern states they enjoy the exclusive right to issue money.

The first United States mint was established at Philadelphia, in 1792. The first coin, the copper cent, was issued in 1793. There are now four mints, located at Philadelphia, San Francisco, New Orleans and Denver. Carson City formerly had a mint, but its operations are now only those of an assay office. All the



UNITED STATES MINT AT PHILADELPHIA

mints and assay offices are under the supervision of the director of the mint, who is appointed by the president and is responsible to the secretary of the treasury. For a description of the processes in the coining of money, see article COINING; for a discussion of the economic nature of money and for a statement of the different coins now in use, see article MONEY.

Mint, the common name of a large and important family of plants that is widely distributed throughout the temperate regions. See LABIATAE.

Min'uit or **Minnewit**, PETER (1580-1641), a governor of the New Netherlands under the Dutch West India Company (1625-1631). He purchased Manhattan Island and built Fort Amsterdam on the present site of New York City. He later laid the foundations of Fort Christopher (Wilmington) in Delaware, under the auspices of the South Company of Sweden.

Minute, *min'it*, a division of time and of angular measure. As a division of time it is the sixtieth part of an hour. As a division of angular measure it is the sixtieth part of a degree.

Miocene, *mi'o seen*, **Epoch**, a division of

geologic time, including the middle portions of the Tertiary Period and extending from the Oligocene to the Pliocene epochs. In the United States the formations of this epoch are gravel, sand, volcanic tuffs and ashes. It was during this epoch that Central America and the Isthmus of Panama were raised above the sea.

Mirabeau, *me ra bo'*, GABRIEL HONORÉ RIQUETTI, Count de (1749-1791), a French statesman and revolutionary leader. At an early age he manifested extraordinary intelligence, but his youth was a stormy and licentious one. He lived for some time in Holland and England, returning to France in 1785. On the assembling of the States-General in 1789, Mirabeau, elected for Aix, soon became prominent. When the king required the third estate to vote apart from the other two orders, it was Mirabeau who counseled resistance, demanded the withdrawal of the troops, consolidated the National Assembly and defied the king's orders. As a practical statesman, Mirabeau desired action, and for this reason he attempted to form alliances with Lafayette, the duke of Orleans, Necker and, finally, with the queen. Whether he might ultimately have been able to guide the revolution into peaceful ways has always been a matter of conjecture with historians, but it is certain that he was the only man who might possibly have done it.

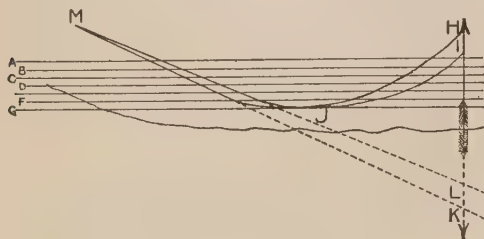
Mir'acle, (a wonder, a prodigy), a suspension of, or deviation from, the known laws of nature, brought about by the direct interference of a Supreme Being. It is in its nature, as the term implies, an occurrence which is strange, marvelous, inexplicable, and it is usually connected with some remote moral purpose. By the elder theologians a miracle was conceived to be the triumph of the Divine Will over the work of his hands and the laws of his making. In modern doctrine, however, it is not considered to give evidence of opposing forces.

Miracle Plays, a sort of dramatic entertainment common in the Middle Ages, in which the subjects were taken from the lives of saints and the miracles they wrought. They were originally performed in church, but latterly outside, in market places and elsewhere. In England they were first produced in the twelfth century. They differed from the mysteries mainly in subject.

Mirage, *me rahzh'*, the appearance of an object in the sky, due to the reflection of rays of light by a layer of atmosphere of different density from that in which the object is situated

Miramichi

(See **LIGHT**, subhead *Reflection of Light*). A mirage is an optical illusion and is usually seen on deserts, where the intense heat of the land causes the layers of atmosphere near the ground to be much rarer than those above. In the figure, the rays *ABCDEFG*, striking the object *H*, are refracted downward, and they are not reflected back until they strike the surface of the layer *J*. This acts like a mirror and reflects the rays to *I*. The observer at *M* sees the object at *L* and *K*; consequently, it appears inverted, as though it were reflected in a pool or lake. This illusion is very deceptive and often



leads travelers to think that they are near bodies of water when no water is present. Sometimes objects are seen inverted in the sky without any apparent cause. This is because some intervening object occurs between the observer and the object which produces the image. The most perfect mirage is produced when the sun is near the horizon, just at sunrise or sunset, since at those times the sun's rays are nearly horizontal and the refraction and reflection are nearly perfect. It is because of this that people living in valleys can often see the summits of mountains at morning or evening which are invisible during the remainder of the day.

Miramichi, *mir a me she'*, a river of New Brunswick, Canada. It rises in two branches, flows in a general easterly direction for about 220 miles and empties into Miramichi Bay. Its length is about 220 miles, but it is navigable for only about 45 miles.

Mirror, a smooth surface capable of reflecting regularly a great proportion of the rays of light that fall upon it. In the ordinary sense, a mirror is a pane of glass coated on the back with an amalgam of mercury and tin. The mirrors used by the ancients were made of thin polished bronze, either set in a case or fitted with a handle. At a later period they used mirrors made of obsidian, a stone closely resembling black glass and capable of taking a high polish.

A *plane mirror* is one having a flat surface.

Mirror

Plane mirrors are those in common use in homes and public buildings. The image seen in a plane mirror is of the same size as the object and appears as far behind the mirror as the object is in front of it, but with the sides reversed. The right hand of your image when seen in a mirror is where your left hand would be were you facing in the same direction. The image seen by one observer is not that seen by another. In Fig. 1 let *MN* represent the mirror and *E* and *F* represent two observers. *AB* is the object and *A'B'* the image. The observer at *E* can see the image in the direction of the rays *EA'* and *EB'*, while the observer at *F* would see the image in the direction of *FA'* and *FB'*.

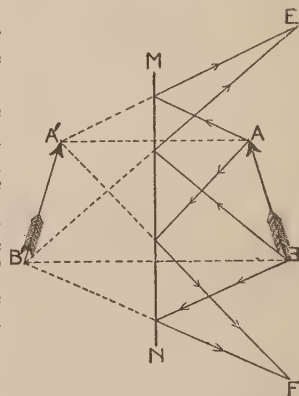


FIG. 1

A *concave mirror*, like a lamp reflector, is a section of the inside of a hollow sphere. When parallel rays of light strike a concave mirror, they are reflected to a common point, called the *focus*. The focus is in front of the mirror and directly opposite its center. Concave mirrors show two kinds of images. When the object is farther away from the mirror than the point which would form the center of the sphere of which the mirror is a

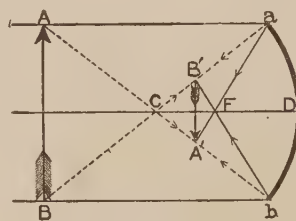


FIG. 2

part, the image formed is inverted and smaller than the object. It appears on a screen in front of the mirror, as shown in Fig. 2. The rays of light from the object, *AB*, are reflected to *a* and *b*, while the rays *Ab* and *Ba*, which strike the mirror perpendicularly, are reflected back upon themselves. The rays *Aa* and *Bb* are reflected respectively at *aA'* and *bB'*. These reflected rays cross each other at *F*. The rays *Ab* and *Ba* cross at *C*. If the screen is placed at the point where these two sets of rays meet, it receives the image *A'B'*. If the screen is moved either toward

the mirror or away from it, some of the reflected rays are lost and the image becomes indistinct. When the object is nearer the mirror than the center of the sphere of which the mirror forms a part, the image appears back of the mirror and is erect and magnified. This effect can easily be produced by using a common lamp reflector and holding the finger or some other object in front of it.

A *convex* mirror is formed from the section of the outside of a sphere. The image formed by such a mirror is always seen back of the mirror and is erect and smaller than the object. Most hand mirrors are slightly convex. We notice that the image in such a mirror is distinct and considerably smaller than the object. See LIGHT, subhead *Reflection of Light*.

Mishawaka, *mish a waw'ka*, IND., a town in Saint Joseph co., 4 mi. e. of South Bend, on the Saint Joseph River, and on the Grand Trunk and the Lake Shore & Michigan Southern railroads. The various manufactures include wind-mills, machinery, agricultural implements, furniture, organs and other articles. It is one of the oldest towns in the state, having been settled in 1828. It was known as "Saint Joseph Iron Works" until the present name was given ten years later. Population in 1910, 11,886.

Mis'sal, the book of the Roman Catholic Church containing the complete service for mass throughout the year. Pope Pius V in 1520 revised the missal, and its use was required in all churches which could not show that their own service-book had been in uninterrupted use for two hundred years. Clement VIII in 1604 and Urban in 1634 revised the missal, the latter revision being still in use.

Missionary, *mish'un a ry*, **Ridge**, BATTLE OF. See CHATTANOOGA, BATTLES OF.

Missions and Missionaries. Missionaries are men who devote their lives to the enlightenment and conversion of peoples, in the interest or under the auspices of some religion or religious organization. The first great Christian missionary was Saint John the Baptist, who preached the coming of Christ. Jesus commissioned his apostles to preach the gospel to all nations. They and their successors obeyed implicitly, and the result was the marvelous spread of the great religion, which soon had found its way over all parts of Europe.

A new impulse was given to missions by the discovery of the New World. Almost every merchant ship that sailed for the West Indies, Mexico, Peru and Brazil was accompanied by

zealous missionaries, eager to spread the Christian religion in the new lands. The powerful order of Jesuits turned their attention to the East, and the celebrated Francisco Xavier, a member of the order, met with remarkable success in India (See JESUITS). Thence Christianity was introduced into Japan, from which, however, it was forced to retire, because of the terrible persecutions waged against its missionaries. Father Ricci, another Jesuit, succeeded by the end of the sixteenth century in establishing a foothold in Peking. Roman Catholic missions since the early part of the seventeenth century have been thoroughly organized and have spent enormous sums of money in carrying their religion into all parts of the world. The Catholics of the United States have, since 1884, helped materially in supporting the missions for indians and negroes, besides contributing generously to the foreign fund. The most active missionary body is the Society of Jesus, or the Jesuits. It is estimated that there are now more than 60,000 Catholic workers, and that there is scarcely any part of the world unvisited by them.

The earliest Protestant foreign mission appears to have been one which was established by the French in Brazil in 1555. Shortly after the settlement of New England in 1620, John Eliot took a deep interest in the North American indians, and in 1646 he began a regular mission among them. It was not, however, until the eighteenth century that the true missionary spirit became general. The English took the lead and were speedily followed by the Danes and, especially, the Moravian Germans. The missionary idea spread among the various Protestant denominations, and all of them now have societies which contribute workers and money annually. The total number of societies engaged in these missionary enterprises is over 550, and they are represented in the field by about 18,000 missionaries and 79,000 native helpers. In modern times the missionaries have not confined themselves solely to the teaching of their religion, but have paved the way for it by the establishment of schools, the medical treatment of the sick and suffering natives and by teaching right methods of living. In all times, missionaries have been the pioneers of the civilization which they represent. They have paved the way for the soldier and the trader, and the hold which the western nations now have upon China, Japan and other oriental countries is due largely to their early influence.

Mississip'pi, the **BAYOU STATE**, one of the Gulf states, is bounded on the n. by Tennessee, on the e. by Alabama, on the s. by the Gulf of Mexico and Louisiana and on the w. by Louisiana and Arkansas, from which it is separated by the Mississippi River. Its extreme length from north to south is 330 miles, and its extreme width is 188 miles. The average width is about 150 miles, and the area is 46,865 square miles, of which 503 square miles are water. Population in 1910, 1,797,114, an increase of 245,844 since 1900.

SURFACE AND DRAINAGE. The highest land is in the northwest corner of the state, where the highest altitudes reach about 1000 feet. A low watershed, extending north and south, divides the state into two river basins—the eastern, which is drained into the Gulf of Mexico, and the western, which is drained into the Mississippi. This ridge is of rolling land broken into valleys, through which streams flow. To the west of it the land slopes into the bottom lands of the Yazoo and the Mississippi. These lands are low and level. To the east of the ridge the surface consists of rolling prairie. Over 7000 square miles of the surface consist of bottom lands which are so low that most of them have been reclaimed by the construction of levees. These bottom lands exceed 7500 square miles in extent, or more than one-sixth of the area of the state. The Yazoo bottoms occupy a greater part of this area. Bluffs, varying in height from 100 to 300 feet, rise on the east of these lands. See **LEVEE**.

The principal streams watering the eastern part of the state are the Tombigbee, the Pearl and the Pascagoula, all flowing directly into the Gulf. The chief tributaries of the Mississippi are the Yazoo, the Big Black, the Tallahatchie, the Sunflower and the Homochitto. There are no lakes except those directly connected with the rivers.

CLIMATE. Mississippi has a semi-tropical climate. The summers are long, but the intense heat which would otherwise prevail is tempered by breezes from the Gulf, and the thermometer seldom reaches 100°, while the mean for the summer is about 81°. The winters are short and mild, the mean temperature being about 45°. The northern part of the state is much cooler in winter than the southern. In the north, ice usually forms and snow is not uncommon. The average rainfall is about 50 inches for the entire state, but it is much greater in the southern than in the northern part. The heavi-

est rains occur in late winter or early spring and are caused by the meeting of the warm winds from the gulf and the cold winds from the north.

MINERAL RESOURCES. The mineral resources are not abundant. Coal and limestone suitable for making hydraulic cement occur in the north-eastern counties, gypsum is found in the central part of the state, and clays and phosphate rock are quite generally distributed, though they are used only for local purposes. The state contains a large number of mineral springs, some of which have become somewhat famous as resorts. Among these are Iuka Springs, in the north-eastern county, and Ocean Springs, in the south-eastern part of the state.

AGRICULTURE. Agriculture is the leading industry. The soil is highly fertile, and the climate is remarkably well suited to the production of all crops adapted to a semi-tropical and warm temperate climate. The bottom lands are especially fertile and suitable for the raising of sugar cane in the southern part of the state and the growing of cotton in other regions. Cotton is the chief crop and occupies fully one-half of the acreage planted. In the production of cotton Mississippi is the fifth state in the Union. Among the cereals, corn and oats are the most important. Wheat, potatoes, hay and peas are also raised in large quantities, and in the southern part of the state attention is given to the raising of oranges, figs and other fruits which grow in a semi-tropical climate. Some rice is produced on the bottom lands, but it has not yet become an important crop.

MANUFACTURES. Mississippi is not primarily a manufacturing state, yet since 1890 the manufacturing industries have developed rapidly. The most important of these is the manufacture of lumber and timber products. Over 32,000 square miles of the state are covered with forests. In the southern section the yellow pine prevails, while in the central and northern forest areas are found a large number of species of hard wood, such as oak, hickory, locust and walnut, all of which are valuable for timber. The second industry in importance is the manufacture of cottonseed oil and cake. This is followed by cotton ginning; then in their order come the production of turpentine and resin, the manufacture of cotton goods and the manufacture of cars and other railway appliances.

TRANSPORTATION AND COMMERCE. The state contains about 4400 miles of railway. Important

trunk lines extend north and south through the eastern, central and western portions of the state. There are also lines crossing the northern and central parts of the state from east to west. All these are connected by cross lines, so that the principal towns have railway communication, but there are a number of counties yet untouched by railroads. The Mississippi constitutes a valuable waterway for all of the counties on the western border.

The commerce of the state consists in the exportation of timber and timber products, cotton and fruit and the importation of manufactured goods.

GOVERNMENT. The legislature consists of a senate and a house of representatives, the members of each being elected for four years. The regular sessions occur once in four years, but special sessions, which cannot last over thirty days except by the governor's proclamation, meet two years after each regular session, unless sooner assembled by the governor. The executive department consists of a governor, a lieutenant governor, a secretary of state, an attorney-general, a treasurer and an auditor, each elected for four years. The first and the last two named cannot succeed themselves or one another. The state judiciary consists of a supreme court of three judges, appointed by the governor and senate for nine years, and circuit and chancery courts, over which judges are appointed for terms of four years. The local government is by counties, and each county is divided into districts. The township is not recognized.

EDUCATION. Separate schools are maintained for white and for colored pupils, and in all of the larger towns these continue for nine months in the year. In the rural districts the terms are somewhat shorter. The annual expenditure for schools is about \$1,500,000, most of which is raised by local taxation. The administration of the schools is in the hands of a state board of education, composed of the secretary of state, the attorney-general and the superintendent of education. The country superintendents are elected by popular vote at the general elections. The state university is at Oxford, and the agricultural and mechanical college is near Starkville. There is also a state normal industrial school for girls at Columbus, a state normal school for colored students at Holly Springs and Alcorn Agricultural and Mechanical College for colored youths at Westside. The leading educational institutions maintained by the different denominations are the Mississippi

College at Clinton, Woman's College at Oxford and Millsaps College at Jackson. The higher educational institutions for colored students are the Rust University at Holly Springs and Tougaloo University near Jackson.

INSTITUTIONS. The state school for the deaf and dumb and the school for the blind are at Jacksonville. The hospitals for the insane are at Jackson and Meridian. There are also two state hospitals, located respectively at Natchez and Vicksburg. The penitentiary is at Jackson.

CITIES. The chief cities are Jackson, the capital; Meridian, Natchez, Vicksburg, Greenville, Columbus and Biloxi, each of which is described under its title.

HISTORY. The first European to pass through the region of Mississippi was the Spaniard De Soto, in 1541, but he left no settlements. La Salle took possession of the country in the name of France, in 1682. The first colony was established at Biloxi, in 1699, by d'Iberville. The territory did not prosper under French rule and was ceded to Great Britain in 1763. The colony flourished until 1781, when the southern part of it, known as West Florida, was subjugated by the Spanish. By the Treaty of 1783, the northern boundary of West Florida was placed at 31°, and a long dispute ensued until 1795, when Spain released her claim to territory north of that line. In 1798, the Territory of Mississippi was organized; in 1817, Mississippi was admitted as a state. Jackson, the capital, was founded in 1821. By treaties of 1830 and 1832 the lands of the Indians in the northern part of the state were ceded to the state and thrown open to settlement. In 1832 a new constitution was adopted. The state took radical ground against the anti-slavery cause and adopted the ordinance of secession Jan. 9, 1861. One month later Col. Jefferson Davis was elected president of the Confederacy. In or on the borders of Mississippi were fought the battles of Shiloh, Corinth, Port Gibson, Vicksburg and other smaller engagements, and much of her best territory was devastated by Union armies. During the reconstruction period, the state suffered severely from the extravagance and corruption of its carpetbag and negro rulers. It was among the first to establish a provisional government by executive order, but it was not recognized as a state until after the ratification of a liberal constitution and the acceptance of the Fourteenth and Fifteenth Amendments, in February, 1870. By a new constitution in 1890, suffrage was limited to

those able to read or interpret any passage of the Constitution. Consult Tracy's *Mississippi As It Is*.

Mississippi (from an indian word meaning *father of waters*), the principal river of North America and one of the largest rivers in the world. It has its source in Lake Itasca, in the State of Minnesota, and flows southward through a number of lakes and over a series of rapids until it reaches the Falls of Saint Anthony. Within the next six hundred miles it receives the Wisconsin, the Iowa, the Illinois and the Missouri as tributaries. The Missouri is really the main stream, as its length, before the rivers unite, is much greater than that of the Mississippi before the junction. From Saint Louis, a little below their confluence, the Mississippi becomes a broad, rapid, muddy river, liable to overflow its banks. Lower down it receives in succession the Ohio, the Arkansas and the Red rivers, and it finally enters the Gulf of Mexico through a large delta with several "passes," some distance below New Orleans.

The combined length of the Missouri and the Mississippi is about 4200 miles; the whole area drained is about 1,257,000 square miles. It is estimated that the volume of water discharged into the Gulf of Mexico is about 670,000 cubic feet per second. The Mississippi with its tributaries affords about 14,000 miles of navigable waterway. The volume of the river is usually smallest in October and greatest in April, and the low-lying lands are subject to damaging floods during the spring freshets. At many places attempts have been made to secure the river within its banks and to save the country from loss and suffering by building dikes, or *levees*, as they are called (See **LEVEE**; **JETTY**). The sediment carried down, however, is continually raising the bed of the river, and thus breaks are frequently made in these levees. A recent method of improving the river's course is to construct light willow screens, or dams, on the shoals and at the wide places on the river where bars already exist. By this means a deposit is formed which in time will act as a bank to hem in the river, while the increased volume thus obtained will help to scour out a deeper channel.

The most important towns on the Mississippi are Minneapolis and Saint Paul, Minn.; La Crosse, Wis.; Dubuque, Iowa; Galena and Moline, Ill.; Davenport, Iowa; Rock Island, Ill.; Burlington and Keokuk, Iowa; Quincy and Alton, Ill.; Saint Louis, Mo.; Cairo, Ill.; Mem-

phis, Tenn.; Vicksburg and Natchez, Miss.; Baton Rouge and New Orleans, La.

Mississippi, UNIVERSITY OF, a state educational institution, situated at Oxford, Miss. The university was opened in 1848, but during the Civil War work was suspended. It maintains departments of liberal arts, science, pedagogy, philosophy, law, mining and civil and electrical engineering. It is affiliated with the high schools of the state, and students from approved schools are admitted without examination. The students number about 250, and there are over 20 members in the faculty. The library contains 19,000 volumes, and the institution has an endowment of \$780,000.

Mississippi Scheme, a financial scheme projected by John Law, at Paris, in 1717. Part of the scheme was for the colonization and development of the Mississippi Valley, but combined with this there was a banking plan and a scheme for the management of the national debt, the whole being supported by the French government. Such were the hopes raised by this undertaking that the shares were sold at ten, twenty, thirty and even forty times their value. People came from all parts of France, and even from foreign countries, in order to invest in the company, and there was a general mania of speculation. The state took advantage of the popular frenzy to issue increased quantities of paper money, which was readily accepted by the public creditors of Law's company. The value of the paper money depreciated, and the shares fell in price. Law, the originator of the bankrupt company, fled from France, and the state acknowledged itself debtor to the shareholders.

Missolonghi, *mis so lon'ge*, or **Mesolonghi**, a town of Greece, capital of the nomarchy of Acarnania and Aetolia, on the Gulf of Patras. During the Greek War of Liberation (1822-1826), the city was one of the strongholds of the Greeks. Byron died here, and his statue and a mausoleum which contains his heart are here. Population, 8400.

Missoula, *mi zoo'la*, **MONT.**, the county-seat of Missoula co., 125 mi. w. of Helena, on the Hell Gate River and on the Northern Pacific railroad. The city has a beautiful location near snow-capped mountains, in a region which by irrigation has been made exceedingly productive of various fruits and grains. Lumbering and mining are also carried on, and there are railroad shops, planing mills, flour mills and other works. It is the seat of the state university and

has the Sacred Heart Academy and the Garden City Commercial College. Missoula was settled in 1864 and was incorporated in 1887. Population in 1910, 12,869.

Missouri, *miz zoo'ri*, an indian tribe, reduced in 1823 to about eighty persons by the inroads of smallpox. The remnant joined the Oto, to whom they were related, and removed to a reservation in Oklahoma.

Missouri, the **BULLION STATE**, one of the West Central states, bounded on the n. by Iowa, on the e. by Illinois, Kentucky and Tennessee, on the s. by Arkansas and on the w. by the new state of Oklahoma, Kansas and Nebraska. The length from north to south is 287 miles, and the average width, about 255 miles; the extreme width is 305 miles. The area is 69,420 sq. mi., of which 693 sq. mi. are water. The population in 1910 was 3,293,335.

SURFACE AND DRAINAGE. The Missouri River divides the state into two unequal sections. That portion north of the Missouri is mostly rolling prairie, diversified by occasional hills and valleys and containing growths of timber along the streams. The portion south of the Missouri is naturally divided into three physical regions—the western plain, which is continuous with the plains of Kansas and is undulating; the Ozark Plateau, a region of elevated hilly or mountainous country, extending across the state from east to west and continuous with the Ozark Mountains in Arkansas and Illinois, and the low lands in the southeastern part of the state. The Ozark Mountains are not very high, seldom exceeding 2,000 feet above sea level.

The principal rivers are the Mississippi, which borders the state on the east, and the Missouri, forming the northern part of the western boundary and then flowing across the state in a southeasterly direction to join the Mississippi a few miles north of Saint Louis. The chief tributaries of the Missouri from the north are the Platte, the Grand and the Chariton, while the Wyaconda and the Salt drain the northeastern portion of the state directly into the Mississippi. South of the Missouri and flowing into it are the Osage, the Gasconade and the Lamine, while south of the Ozark Plateau and flowing into Arkansas are the White, the Black and the Current, which is a tributary of the Black. The Maramec rises in the heart of the Ozarks and flows easterly into the Mississippi. The Saint Francois drains the southeastern plain into the Mississippi and forms the western boundary of a portion of the state.

CLIMATE. Situated in the interior of the continent, Missouri has a climate characterized by extremes of heat and cold. The summers are hot, especially in the southeastern part of the state, where the thermometer often reaches 100° or higher. The Ozark Plateau has a fine climate. Although the days are warm in summer, the nights are always cool. The northern portion of the state has somewhat cooler summers and more severe winters. The average temperature for January ranges from 35° in the southeastern to 20° in the northern part of the state; while the July temperature varies from 80° to 75°. The annual rainfall varies from about 60 inches in the southern counties to 35 inches in the north. This is quite evenly distributed through the year, and all parts of the state usually have an abundance of moisture for agricultural purposes.

MINERAL RESOURCES. Missouri is rich in minerals. Most valuable among these are the coal deposits, occupying a large portion of the state north and west of a line joining Springfield and Hannibal. These are a continuation of the coal fields of Kansas and Iowa. In the southwestern part of the state are extensive deposits of zinc and lead ore, which in and about Joplin, Webb City, Aurora and Granby are extensively worked. The Ozark Plateau also contains extensive beds of iron ore, which are most prominent in the vicinity of Iron Mountain and Pilot Knob (See **IRON MOUNTAIN**). Granite, limestone, clay and other materials suitable for building purposes are widely distributed.

AGRICULTURE. The northern, western and southeastern parts of the state have a deep, fertile soil and are especially suited to the growing of corn, grass, hay and other crops suitable for feeding stock. The central part of the state is given largely to stockraising and tobacco. On account of its fine blue grass it rivals Kentucky in fine horses. The Ozark region is devoted largely to fruit, poultry and dairying. Apples are generally grown throughout the state. In the extreme southeastern portion considerable attention is given to raising cotton. Throughout the state there are excellent grazing lands, and Missouri is one of the leading states of the Union in the production of live stock, especially mules, cattle and swine. The proximity of the state to the markets in Kansas City and Saint Joseph makes the fattening of cattle and hogs very profitable. Mules and blooded horses are largely exported to other states. Large numbers

of sheep are also raised, and the wool crop is important. Among the cereals, corn occupies the chief place, followed by wheat and oats.

MANUFACTURES. Missouri is the leading manufacturing state west of the Mississippi River. The most important manufacturing industries are slaughtering and meat packing, the making of flour and grist mill products, tobacco and cigars, malt liquors, lumber, cement and foundry and machine shop products. The southeastern portion of the state contains extensive forests, and the lumber interests are well developed, though they do not compare in importance with those of some of the states farther south. Other industries of lesser importance are printing and publishing and the manufacturing of carriages and wagons, boots and shoes. Over two-thirds of the manufactures are located in and about Saint Louis, other important centers being Kansas City and Saint Joseph, while the smelting of zinc is carried on chiefly at Joplin.

TRANSPORTATION. The northern half of Missouri is in the region traversed by the great trunk lines of railways, extending east and west across the country. Cross lines connect them and give this portion of the state ample railway facilities. The southern part, however, is not so well favored, and a few counties are without railway communication. Within the past ten years the Frisco System has built a great network of roads in South Missouri, making Springfield and Cape Girardeau centers. The entire mileage of the state exceeds 10,000 miles. The Mississippi River furnishes ample water communication with the Gulf and the ocean. While the Missouri is navigable, the development of railways along its course has lessened its importance as a waterway.

COMMERCE. The commerce of the state is extensive. The exports are live stock, meats, lead, zinc, iron ore, fruits and vegetables and numerous manufactured products, while the imports consist of food products and raw material for manufactures. Much of the commerce and transportation consists in the transit of commodities across the state from east to west, Saint Louis being one of the great distributing centers for the southwestern part of the United States.

GOVERNMENT. The legislature consists of a senate of 34 members elected for four years, and a house of representatives of 142 members, elected for two years. The sessions are held biennially and are practically limited to seventy

days. The executive department consists of a governor, a lieutenant governor, a secretary of state, an auditor, a treasurer, an attorney-general and a superintendent of public instruction, each elected for four years. The governor and the treasurer cannot succeed themselves. The courts consist of a supreme court of seven judges, elected for ten years, three district courts of appeal located at Saint Louis, Kansas City and Springfield, each having three judges elected for twelve years, and circuit courts, presided over by judges elected for six years. Each county has a probate and county court, and there are also justice courts in villages and towns.

EDUCATION. The public school system is on the district plan. At the head of this system is the superintendent of public schools. The schools in the towns are well graded, and the terms are long; many of the rural schools are graded, but have short terms. However, these schools are making steady progress towards a higher standard under efficient supervision. There is a compulsory attendance law. State normal schools are maintained at Warrensburg, Kirksville, Cape Girardeau, Springfield and Maryville. At Jefferson City is Lincoln Institute, for the training of colored teachers. The University of Missouri is located at Columbia, and many of the high schools of the state are affiliated with it and, through this arrangement, with other universities as well. The other important universities are the Washington University at Saint Louis, a non-sectarian institution, and the Saint Louis University, a Roman Catholic institution.

INSTITUTIONS. The state school for the deaf and dumb is at Fulton, and the school for the blind is at Saint Louis. The hospitals for the insane are located at Farmington, Saint Joseph, Fulton and Nevada, and there is an institute for the feeble-minded at Marshall. The state tuberculosis sanatorium is located at Mount Vernon. A state prison is located at Jefferson City, a boys' reform school, at Boonville and a girls' reform school, at Chillicothe.

CITIES. The chief towns are Jefferson City, the capital; Saint Louis, Kansas City, Saint Joseph, Springfield, Joplin, Sedalia, Hannibal, Cape Girardeau, Carthage, Moberly, Nevada, Chillicothe and Independence, each of which is described under its title.

HISTORY. Missouri was explored in 1541 by Fernando De Soto, the Spanish adventurer. In 1673 Marquette and Joliet passed its shores, and in 1682 La Salle took possession of the

country in the name of Louis XIV. In 1719 the French began to explore the interior. The first permanent settlement was made at Saint Genevieve, about 1735. The next settlement of any consequence was Saint Louis, founded by Pierre Laclede in 1764. By the Treaty of Paris in 1763, Missouri, along with all territory west of the Mississippi, was transferred to Spain, and it was ceded by Spain to France in 1800; it formed part of the Territory of Louisiana, purchased by the United States in 1803. In 1812 it was set apart as the Territory of Missouri. At that time there was a population of over 20,000, and the chief occupations were agriculture, fur-trading and mining. In 1817 the Territorial Legislature applied to Congress for permission to prepare a State Constitution. In 1821 Missouri was admitted to the Union, after a long contest over slavery (See MISSOURI COMPROMISE). Alexander McNair was the first governor under the State Constitution. The first capital was Saint Charles, chosen in 1820, but Jefferson City became the permanent seat of government in 1826. Missouri soldiers engaged in several Indian Wars, notably in the Black Hawk War in 1832; the state troops also fought in the Florida War in 1837 and in the Mexican War in 1846. The people of Missouri were almost equally divided in sentiment on the slavery and secession question and provided troops for both sides during the Civil War. The Union early gained control of the state, and a loyal government was organized, which, however, was not recognized until 1864. Almost immediately after the close of the war, the state entered upon an era of wonderful prosperity. A world's fair was held at Saint Louis in 1904, celebrating the centennial of the Louisiana Purchase. Consult Carr's *Missouri*, in the American Commonwealths Series.

Missouri, UNIVERSITY OF, a state institution of higher learning, founded at Columbia, Mo., in 1839. It comprises colleges of liberal arts and of agricultural and mechanic arts, a graduate school and schools of journalism, education, law, medicine, military science and tactics and of mines and metallurgy. The faculty numbers about 250, and the enrollment is about 3000. The library contains 150,000 volumes.

Missouri Compromise, the name given to an act of Congress, approved March 6, 1820, by which Missouri was admitted to the Union as a slave state, but slavery was forever prohibited north of the southern boundary of Missouri, namely 36° 30' north latitude. At the same

time, but by a separate bill, Maine was admitted as a free state. The act was the outcome of a long period of discussion between the slavery and the anti-slavery parties. Up to that time the number of free and slave states had remained equal; therefore, the admission of Missouri as a free or a slave state would disturb this equilibrium. Many bills were introduced by each party after 1819, and the bill, as finally passed, was the result of numerous amendments and resolutions, proposed by both the House of Representatives and the Senate. Its passage was largely due to the influence of Henry Clay, then speaker of the House. In the following year another bill was passed, delaying the admission of Missouri to the Union until that state through its legislature had declared that no law would be passed which would abridge the rights guaranteed to all citizens by the Federal Constitution. This was to prevent the insertion of a proposed paragraph in the state constitution prohibiting the immigration of free negroes.

Missouri River, a great river of the United States, the principal tributary of the Mississippi. Measuring from its source to the mouth of the Mississippi, it is the longest river in the world. It is formed by the junction of the Jefferson, the Madison and the Gallatin rivers, which rise in the Rocky Mountains and unite near Gallatin City, Mont. After the junction of these three streams, the newly formed river flows first north, then east across Montana, and enters North Dakota, through which it flows in a curve southeast into South Dakota. After passing across the entire width of South Dakota, it forms the northeastern boundary of Nebraska, and after a turn toward the south, it forms the dividing line of Nebraska from Iowa and Missouri. It flows between Kansas and Missouri as far as Kansas City, when it turns east and flows across Missouri to the Mississippi, which it enters 20 miles above Saint Louis. From the source of the Jefferson, the longest of the three branches of which it is composed, to its mouth at the Mississippi, the Missouri River is 2950 miles long and with the Lower Mississippi it is 4200 miles long. It is a swift and turbid stream. Its chief tributaries are the Yellowstone, the Cheyenne, the White, the James, the Big Sioux, the Platte, the Grand and the Osage, and the chief towns on its banks are Kansas City, Leavenworth, Atchison, Omaha, Council Bluffs, Sioux City, Pierre, Bismarck and Great Falls.

Mist. See Fog.

Mistletoe

Mistletoe, *mis' l'to*, a parasitic, evergreen plant which grows on many trees, especially on the oak and the cypress. It is a great, bushy ball of yellowish-green twigs, each bearing two rough, green leaves, with small, yellowish flowers between the leaves and at the forks of the stem. In the winter the plant is covered with small white berries. Mistletoe is found in Europe and in the United States, but while the two plants are very similar in appearance, they are not closely related. In olden times the mistletoe was regarded by the Druids with great veneration. The priests gathered the plant only with a golden knife on the sixth day after the first new moon of each year and, dividing it with great ceremony, distributed it among the people, who wore it sacredly as a charm to keep off evil. It is still a favorite Christmas decoration, and in both Europe and America it is a playful custom to claim that a man has a right to kiss a woman whom he discovers under the mistletoe on Christmas eve.

Mitch'ell, S. D., the county-seat of Davison co., about 70 mi. w. of Sioux Falls, on the Chicago & Northwestern and two divisions of the Chicago, Milwaukee & Saint Paul railroad. The city is in a fertile region which produces wheat and live stock, and it contains a creamery, railroad and machine shops, grain elevators, brickyards, lumber yards and other establishments. It is the seat of Dakota Wesleyan University. It was settled in 1879 and was incorporated four years later. Population in 1910, 6515.

Mitchell, DONALD GRANT (1822-1908), an American author, better known as Ik Marvell. He was born at Norwich, Conn., received his education at Yale and after working for some years on a farm, traveled in Europe. For a time after his return he studied law, but soon gave up that profession and turned to literature. His most popular book, *Reveries of a Bachelor*, appeared in 1850, and this was followed in the next year by *Dream Life*.

Mitchell, JOHN (1869-), a labor leader, formerly president of the United Mine Workers of America. He was born in Will County, Illinois, received a limited education, later studied law and for a time was employed in Illinois coal fields. After 1885 he was closely connected with the labor union movement and after 1890 continuously held some office in the United Mine Workers of America and was also a conspicuous leader of the American Federation of Labor. He was elected president of the former in 1899 and was continuously reelected

Mites

for several years. As director of the great anthracite coal workers' strikes of 1900 and 1902, he was generally commended for his



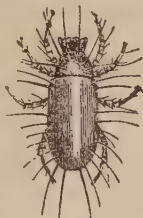
JOHN MITCHELL

moderate and reasonable attitude. He has also been prominent in the National Civic Federation.

Mitchell, SILAS WEIR (1829-1914), a distinguished American physician, who achieved even more fame as a writer of essays and fiction. Doctor Mitchell's specialty was the treatment of nervous diseases, and his "rest cure" system has become the leading method in all parts of the world. He wrote essays voluminously on a great variety of medical topics, and published, among other medical books, *Injuries of Nerves and Their Consequences*; *Wear and Tear, or Hints for the Overworked*, and *Lectures on Diseases of the Nervous System, Especially in Women*. In general literature, Doctor Mitchell began as a writer for children, but soon met with even greater success with his finished essays and strongly written novels. *Characteristics*; *Circumstances*; *Doctor North and His Friends*; *The Adventures of Francois*; *Youth of Washington*, and *Hugh Wynne, Free Quaker*, are among the most popular. The last mentioned, a story of Washington and the Revolution, is generally considered to be his best. His last novel was *Westways*.

Mites, small animals belonging to the same class as the spiders. Some are so small as to be invisible to the naked eye, while others are a half-inch long. Their mouths are fitted for

boring and sucking the juices of the body they infest, for most of them are parasitic. Upon the body of the mite are scales, hairs or bristles of different forms, each characteristic of its own species. Some infest mammals, birds or animals of lower orders, and others are parasitic upon plants. The spinning mites, or *red spiders*, as they are often called, leave a tiny thread wherever they go, and when numerous they will cover a plant with a whitish mass. *Itch mites* burrow into the skin of man and other animals, and *gall mites* produce the peculiar formations seen on leaves and twigs of plants. While some mites destroy the eggs of injurious insects and so are beneficial, the majority of them are injurious, and some do decided damage, not only directly by their parasitism, but in some instances, also, by spreading disease.



MITE

Mitford, MARY RUSSELL (1787-1855), an English writer. Her first publication was *Miscellaneous Poems*, which appeared in 1810 and which was followed by other volumes. Her father, previously wealthy, lost his money, and Miss Mitford was obliged to write for a living. She produced a number of plays, among which are *Julian* and *Rienzi*, and wrote numerous articles for magazines. The most popular of her works was *Our Village*, a volume of charming sketches of village life. *Belford* and *Atherton and Other Tales* are among her other publications.

Mithridates, *mith ri da' teez*, (135-63 B. C.), king of Pontus, on the shore of the Black Sea. Mithridates ascended the throne at the age of thirteen. Soon after attaining his majority, he commenced his career of conquest, which made him master of nearly all of Asia Minor and of Greece and brought him into conflict with Rome. For four years Mithridates disputed possession of Asia, but was at last compelled by Sulla to submit. After the death of Sulla, which occurred in 78 B. C., he levied another army with a determination to expel the Romans from Asia. Being defeated by Lucullus, he was followed by the victorious Romans into his own states and was driven to seek refuge in Armenia. In 67 B. C.,



MITHRIDATES

he completely defeated the Romans; and, following up his success, he rapidly recovered the larger part of his dominions. The Romans now invested Pompey with absolute power in the East, and by him, in 66, the forces of Mithridates were completely routed near the Euphrates. The king retired beyond the Caucasus, and when his troops, headed by his son Pharnaces, broke out in mutiny, he killed himself.

Mjosen, *myö'zen*, the largest lake in Norway, about 40 mi. n. e. of Christiania. Its length is about 55 miles, and its greatest breadth is 12 miles. Its waters are carried by the Vornen into the Glommen.

Mo'abite Stone, THE, an ancient stone discovered in 1868 in Diban, in the ancient Moab, by F. Klein. It is of black basaltic granite, about 3 feet 5 inches high, 1 foot 9 inches in width and the same in thickness, with rounded top but square base, on which there is an inscription of thirty-four lines in the Moabitish language. It was unfortunately broken by the natives, but almost the whole of the inscription has been recovered from the broken pieces. The inscription dates from about 860 B. C., and is the oldest known in the Hebrew-Phoenician form of writing. It records the deeds of Mesha, king of Moab, and his wars with Omri, king of Israel, and his successors. This stone is now in the Louvre in Paris.

Mo'berly, Mo., a city in Randolph co., about 125 mi. n. w. of Saint Louis, on the Wabash and the Missouri, Kansas & Texas railroads. The Wabash has division headquarters and shops here, and there are also brickyards, flour mills, ice factories, foundries, machine shops, planing mills and other factories. The city is near deposits of coal and fire clay and has a valuable trade in farm and dairy produce. It contains the Saint Mary's Academy, a public library and a fine Y. M. C. A. building. Population in 1910, 10,923.

Mobile, *mo beel'*, ALA., the county-seat of Mobile co., 80 mi. s. w. of Montgomery, on Mobile Bay, at the mouth of the Mobile River and on the Louisville & Nashville, the Southern, the Mobile & Ohio and other railroads. The city has good public schools and contains the Medical College of Alabama, the College of Saint Joseph, the Academy of Visitation, Saint Mary's School and the Magill and Evangelical Lutheran institutes. There are numerous libraries, and the charitable institutions include the United States Marine Hospital, a city hospi-

tal, Providence Infirmary and several orphanages. Of the forty churches, the Cathedral of the Immaculate Conception is the most noteworthy building. Other prominent structures are the old courthouse, the tower, the Federal building, the Cotton Exchange and the Chamber of Commerce. There is a large export trade in cotton and cotton products, lumber, coal, live stock, fruits and naval stores. The manufactures include lumber and lumber products, foundry goods, flour, cotton products, tobacco products and brick. The cultivation and the shipping of vegetables are also important industries. The first settlement was made by the French in 1702, about twenty miles up the river. It was ceded to England as a part of West Florida in 1763, was captured by the Spaniards in 1780 and was given to the United States in 1814. In 1864 Admiral Farragut defeated the Confederate fleet in the bay of Mobile and compelled the surrender of forts Gaines and Morgan. The city itself passed into Union hands April 12, 1865. Population in 1910, 51,521.

Mobile Bay, an estuary of the Gulf of Mexico, from 8 to 18 mi. wide and about 36 mi. in length. See MOBILE BAY, BATTLE OF.

Mobile Bay, BATTLE OF, a battle of the Civil War, fought Aug. 5, 1864, between the Federal fleet under Rear Admiral David G. Farragut and a greatly inferior Confederate fleet, supported by land batteries. The entrance to Mobile Bay was protected by Fort Morgan and Fort Gaines, and it had also been blocked with torpedoes and piles, except for a narrow passage directly under the guns of Fort Morgan. Farragut directed the course of his fleet through this narrow passage, and at the same time he conducted a continuous bombardment of the forts. Being confronted by unforeseen obstructions, Farragut was obliged to steer directly across the bay, which was thickly laid with torpedoes. Though these scraped the bottoms of the boats, only one exploded. A fierce battle ensued with the Confederate ram *Tennessee* and a few minor gunboats, and the Confederates were finally compelled to surrender. This was one of the most daring exploits of the war.

Mobile River, a river in Alabama, formed by the union of the Alabama and the Tombigbee, which unite about 45 miles above the town of Mobile. The Mobile is navigable for large steamboats. It enters Mobile Bay by two mouths.

Moccasin Snake, a very venomous serpent, frequenting swamps in many of the warmer

parts of America, especially in the southern United States. It is about two feet in length, dark brown above and gray below. In the North, the copperhead is often called the moccasin.

Mock'ing Bird, a thrush of the southern United States, generally considered the best of native singers. It not only has a delightful song of its own, but it imitates the songs of other birds and can be taught to whistle many tunes. Its peculiar powers of mimicry often enable it to frighten other birds and to deceive even hunters and their dogs. The song of the mocking bird is always associated with the rare and lovely things of southern homes, in many of which it is a favorite cage bird. It is a rather dull colored bird, light brown above and white below, with some white on its wings and tail.

Modena, *mo'da na*, a town of north Italy, capital of a province of the same name, situated in a low but fertile plain between the Secchia and the Panaro, tributaries of the Po. It is 20 miles west-northwest of Bologna. The most remarkable buildings and establishments are the cathedral, several fine churches, the former ducal palace, the university and the public library, which contains about 130,000 volumes. The manufactures and trade are unimportant. Population of commune in 1911, 70,923.

Modjeska, *mo jes'ka*, HELENA (1844-1909), a Polish actress, born at Cracow. When seventeen years old, she married Modrzejewski, a government official of Cracow, and when she went on the stage she abbreviated the name to Modjeska. Her first appearance was in her native city, and her success there was followed by an engagement at the Imperial Theatre of Warsaw. After the death of her first husband she married, in 1868, Count Bozenta Chalpowski and in 1876 they were led by political difficulties to emigrate to California, where they attempted to found a Polish colony. Madam Modjeska, however, returned to the stage the next year, making her first appearance in San Francisco. She made several tours through the United States and England with great success. In 1883 she starred with Edwin Booth. Her favorite rôles were Imogen, Beatrice, Juliet, Rosalind, Lady Macbeth, Camille, Mary Stuart and Cleopatra. (See portrait on next page.)

Mo'doc, a subdivision of the Klamath Indians. The women were skilful weavers, and the men were warlike and sold their captives as slaves to other Indian tribes. After a series of conflicts with the whites, during which treachery was

Moffat

shown by both sides, the tragic end of the Modoc came in 1873. They had killed General Canby at a peace conference and retired to the lava beds, where, after a bitter fight, they were starved out and compelled to surrender.

Moffat, ROBERT (1795-1883), a Scottish missionary traveler. He began missionary work in South Africa in 1817, and his first attempts were made in Namaqualand. Later he went to Bechuanaland, where he established the station



HELENA MODJESKA

of Kuruman. During a visit to Britain, in 1842, he published an account of his travels and a translation of the New Testament and the Psalms in the Bechuana language. He received the degree of D. D. from Edinburgh University, and in 1873 he was presented with a public testimonial of \$29,000, in recognition of his very successful services. One of his daughters became the wife of David Livingstone.

Mo'gul, a word with the same meaning as Mongol, but now applied specifically to the sovereigns of Delhi, who are called Great Moguls, or Grand Moguls. They are descendants of Baber, the Mongol conqueror who established an empire in Hindustan in 1526.

Moham'med or **Mahom'et** (Arabic *Muham-mad*) (about 570-632), the founder of Islamism, an Arabian by birth, of the tribe of the Koreish. He was born in Mecca, of poor parents, who died early, and he was brought up by his uncle, Abu

Mohammed

Talib, who trained him to commerce, and with whom he journeyed through Arabia and Syria. In his twenty-fifth year his uncle recommended him as agent to a rich widow, named Khadija, fifteen years older than he, and he acquitted himself so much to her satisfaction that she married him and thus placed him in easy circumstances. He seems to have had from his youth a propensity to religious contemplation, for he was every year accustomed, in the month of Ramadan, to retire to a cave in Mount Hara, near Mecca, and dwell there in solitude. Mohammed began his mission in the fortieth year of his age, by announcing his apostleship to his own family. His wife was one of the first to believe in him, and among other members of his family who acknowledged his mission was his cousin Ali, the son of Abu Talib. Abu Bekr, a man of estimable character, who stood in high respect, persuaded ten of the most important citizens of Mecca to join the believers in the new apostle. They were all instructed by Mohammed in the doctrines of Islam, which were given as the gradual revelations of the divine will, through the angel Gabriel, and were collected in the *Koran*. After three years Mohammed made a more public announcement of his doctrine, but his followers were few for years. In 621 Mohammed lost his wife, and the death of Abu Talib took place about the same time. Deprived of their assistance, he was compelled to retire, for a time, to the city of Tajf. He was readily received by the pilgrims who visited the Kaaba, and he gained numerous adherents among the families in the neighborhood. Mohammed now adopted the resolution of encountering his enemies with force. This so exasperated them that they formed a conspiracy to murder him; warned of the imminent danger, he left Mecca, accompanied by Abu Bekr alone, and concealed himself in a cave not far distant. Here he spent three days undiscovered, after which he arrived safely at Medina, but not without danger (622 A. D.). This event, with which the Mohammedans begin their era, is known under the name of the Hegira, which signifies *flight*. In Medina, Mohammed met with the most honorable reception; thither he was followed by many of his adherents. He now assumed the sacerdotal and regal dignity, married Ayesha, daughter of Abu Bekr and, as the number of the faithful continued to increase, declared his resolution to propagate his doctrines with the sword. In the Battle of Bedr (623), the first of the long series of battles by which

Islamism was established over a large portion of the earth, he defeated Abu Sofian, the chief of the Koreishites. He in turn was defeated by them at Ohod, near Medina, soon after, and in 625 they unsuccessfully besieged Medina and a truce of ten years was agreed on. Wars with the Jewish tribes followed; many Arabian tribes submitted, and in 630 Mohammed took possession of Mecca as prince and prophet. The idols of the Kaaba were demolished, but the sacred touch of the prophet made the black stone again the object of the deepest veneration and the magnet that attracts hosts of pilgrims to the holy city of Mecca. The whole of Arabia was soon conquered, and a summons to embrace the new revelation of the divine law was sent to the emperor Heraclius at Constantinople, the king of Persia, and the king of Abyssinia. Preparations for the conquest of Syria and for war with the Roman Empire were begun, when Mohammed died at Medina. His body was buried in the house of Ayesha, which afterward became part of the adjoining mosque and a place of pilgrimage for the faithful in all time to come. Of all his wives, the first alone bore him children, of whom only his daughter Fatima, wife of Ali, survived him. There is no doubt that Mohammed was a man of extraordinary insight and deep reflection. Though without book learning, he had a deep knowledge of man, was familiar with Bible narratives and Eastern legends and possessed a grasp of the eternal ground of all religion, though its truths were tinged and modified by his vivid, poetic imagination.

Mohammedan Architecture or Saracenic Architecture, the style adopted by the followers of Mohammed in building their mosques, palaces and tombs. Originally the Arabs possessed no distinctive architectural style, and the style which they at length made their own was developed by architects belonging to the countries which they had conquered. This style is chiefly represented in Egypt, Persia, Spain, Turkey and India, but the Saracenic architecture of Spain is generally called by the distinctive name of Moorish. The most prominent features are the dome, the minaret and the pointed arch. The domes rise from a square base, are graceful in form, are sometimes in groups of three or more and are frequently enriched externally with colored tiles or other decorations. The minarets are slender towers of considerable height, rising in stages, or stories, each with a balcony, and are most frequently octagonal,

sometimes cylindrical, rising, however, from a square base. The arch is of the pointed variety, sometimes of the horseshoe form. Flat surfaces are freely ornamented with a profusion of scroll work and conventional foliage, often in intricate and beautiful designs (See ARABESQUE). Stucco is much used in ornamentation, and brilliant coloring is especially characteristic. In Egypt the Mohammedan art began with the mosque which Amru erected at Old Cairo, about 641 A. D. Subsequently repaired and altered, it may now be considered as a good specimen of Moslem architectural art when freed from Christian influence. See ALHAMBRA; TAJ MAHAL; MOSQUE.

Moham'medanism, the name commonly given in Christian countries to the creed established by Mohammed. His followers call their creed *Islam* (entire submission to the decrees of God), and their common formula of faith is, "There is no god but Allah, and Mohammed is His prophet." The doctrines of Mohammedanism embrace the following points: (1) Belief in God, who is without beginning or end, the sole Creator and Lord of the universe, having absolute power, knowledge, glory and perfection; (2) belief in His angels, who are sinless beings, created of light; (3) belief in good and evil Jinn (genii), who are created of smokeless fire and are subject to death; (4) belief in the Holy Scriptures, which are His uncreated word revealed to the prophets, and of which there now exist, but in a greatly corrupted form, the *Pentateuch*, the *Psalms* and the *Gospels*; and in an uncorrupted and incorruptible state the *Koran*, which takes the place of and surpasses all preceding revelations; (5) belief in God's prophets and apostles, the most distinguished of whom are Adam, Noah, Abraham, Moses, Jesus and Mohammed, Mohammed being the greatest of them all, the last of the prophets and the most excellent of the creatures of God; (6) belief in a general resurrection and final judgment and in future rewards and punishments, chiefly of a physical nature; (7) the belief, even to the extent of fatalism, in God's absolute foreknowledge and predestination of all events, both good and evil.

The practical part of Mohammedanism teaches certain observances or duties, of which four are most important. The first is prayer, including preparatory purifications. At five stated periods each day, with his face turned in the direction of Mecca, the Moslem has to offer up certain prayers held to be ordained by God,

and others ordained by his prophet. Prayers may be said in any clean place, but on Friday they must be said in the mosque. Second in importance stands the duty of giving alms; next the duty of fasting. The Moslem must abstain from eating and drinking, and from every indulgence of the senses, every day during the month of Ramadan, from the first appearance of day-break until sunset, unless physically incapacitated. The fourth important religious duty of the Moslem is making at least once in his life, if possible, the pilgrimage (el-Hadj) to Mecca, after which he becomes a Hadji. The distinctions of clean and unclean meats are nearly the same as in the Mosaic code. Wine and all intoxicating liquors are strictly forbidden. Music, games of chance and usury are condemned. Images and pictures of living creatures are contrary to law. Charity, honesty in all transactions, truthfulness (except in a few cases) and modesty are indispensable virtues. After Mohammed's death Abu Bekr, his father-in-law, became his successor, but disputes immediately arose, a party holding that Ali, the son-in-law of Mohammed, was by right entitled to be his immediate successor. This led to the division of the Mohammedans into the two sects known as Shiites and Sunnites. The former, the believers in the right of Ali to be considered the first successor, constitute at present the majority of the Mussulmans of Persia and India; the latter, considered as the orthodox Mohammedans, are dominant in the Ottoman Empire, Arabia, Turkestan and Africa. The total number of Mohammedan followers in the world is estimated at 200,000,000.

Mohave, *mo hah'vay*, a tribe of indians noted for their strength and fine physical proportions. They live on the lower Colorado River in northern Arizona, where they build log houses of brushwood covered with sand. They raise corn, pumpkins, melons and beans and make fine pottery and excellent baskets. They are a reticent, slow, contented tribe, adhering closely to their old manners and customs. They tattoo themselves and cremate their dead.

Mo'hawk, the chief tribe of the Five Nations, or Iroquoian confederacy, which formerly lived in the lower valley of the Mohawk River. They were among the earliest indians to meet the Dutch and French settlers and soon secured firearms from the former. Armed with these weapons, they became a tremendous power in the confederacy, but their position brought them quickly into conflict with the whites, by

whom they were repeatedly defeated in battle. During the Revolution they sided with the British until, under Brant, they were driven into Canada, where they now live principally as farmers in Ontario. See FIVE NATIONS, THE; IROQUOIAN INDIANS.

Mohawk, a river of the United States, the principal tributary of the Hudson in the State of New York. It rises in Lewis County, flows in a southeasterly direction and empties into the Hudson at Cohoes. Its length is about 160 miles. It affords abundant water power and flows through beautiful scenery.

Mohe'gan or **Mohican**, *mo he'kan*, the most important tribe of Algonquian indians in the southern New England states. The Pequot were a branch of the Mohegan, but at the time of the Pequot War, the Mohegan sided with the whites, to whom they gradually lost their power, and they have disappeared or become mixed with negroes and low whites.

Moki, *mo'ke*, or **Hopi**, *ho'pe*, a tribe of Pueblo indians, that occupy seven villages on isolated tablelands of northern Arizona. These towns are all hundreds of feet above the surrounding desert, and the trails leading to them are exceedingly steep and difficult. As no other Pueblo tribe has been so little influenced by the whites, the customs of the Moki are particularly interesting. Their snake dance is a weird and uncanny performance, the indians dancing around among living rattlesnakes, which they even take into their mouths as they dance.

Molasses, a thick, dark-colored syrup, obtained in the manufacture of sugar. Several varieties are known to the trade, such as *West India*, *New Orleans*, *golden drip* and *sugar house*. The last named is the product of refineries, and is separated from the sugar in the drying machines. Molasses is extensively used in some localities as a substitute for sugar. It is also distilled in the manufacture of rum. See SUGAR.

Moldau, *mole'dow*, the chief river of Bohemia, which, after passing through Prague, joins the Elbe. Its total length is about 350 miles.

Moldavia, formerly a Danubian principality, now a part of Rumania. See RUMANIA.

Moldings, in architecture, a general term applied to the ornaments in cornices, panels, bases and the like, consisting of narrow raisings or lowerings of the surface, which is curved, plane or irregular. The profile is the essential consideration in designing moldings, and in the

art of profiling, the Greeks were masters. The molding was used with excellent effect in the Ionic and Corinthian columns, which were further enriched by elaborate carvings. Moldings fell into disuse after the fourth century, but became common again in the architecture of the Middle Ages, when there was a great variety of design and form.

Molds, minute vegetable growths of a low type, especially such vegetable organisms as appear on articles of food when neglected and on decaying substances.

Mole, a little animal which, in its search for worms or larvae, burrows just under the surface



MOLE

of the ground, throwing up the excavated soil into little ridges or hills. The common mole is found in America from Canada to Florida and all over Europe, except in the extreme south and north. It is five or six inches long and has a large head, without any external ears, and very minute eyes, concealed by its short, soft fur. The common belief that the mole is blind is erroneous. Its fore legs are very short and strong, and its pointed snout is slender and strong. The male builds an underground house of many chambers, from which runways extend in all directions. There are several species of moles, but none is found in the tropics, South America or Africa. One American species has a star- or fringe-like arrangement of the cartilages about the nose, and for this reason it is called the *star-nosed mole*. Certain shrews and other burrowing insectivorous animals are sometimes called moles.

Mole Cricket, a large cricket whose front legs resemble somewhat the front legs of a mole and whose habits are similar to those of the latter animal. The common mole cricket of the United States is about one and a half inches long and is of a brown color. As in its burrowings it often bores through the roots of plants, it sometimes commits devastation in gardens. A larger species is found in South America.

Molecule, a chemical term signifying the small particles of which matter is supposed to

consist. Molecule is, in fact, the name given to the ultimate groups of atoms of which matter is composed. In pure elementary bodies, the molecules would be actual atoms or combinations of atoms with one another, but in all compound bodies the ultimate particles are of course not atoms, but groups of dissimilar atoms. For instance, the ultimate particles of oxygen are single atoms of oxygen, but the ultimate particles of water are not atoms, sometimes of oxygen, sometimes of hydrogen, but they are molecules or combined groups, always composed either of one atom of oxygen with two of hydrogen or of a multiple of that proportion. A molecule of ammonia is composed of one atom of nitrogen and three atoms of hydrogen; an atom of muriatic acid is composed of one atom of hydrogen and one atom of chlorine.

Molecular forces are the forces which bind together the atoms into molecules and which regulate the relations of the molecules themselves, so that the body made up of them assumes the solid, liquid or gaseous state.

Molecular weights are the relative weights of molecules, and these are easily determined by chemists and are always the same for any given substance.

Molière, *mo lyair'*, (1622-1673), the assumed name of Jean Baptiste Poquelin, the greatest of French dramatists. His father was a tradesman connected with the court, and he received a good education. When the father became unable to fulfill his duties, the son took the position, but gave it up for the career of an actor, assuming in this profession the name of Molière. After



MOLE CRICKET AND EGGS

obtaining great success in the provinces, he settled in Paris in 1658, having previously produced his two comedies, *The Madcap* and *The Loving Spite*. In the following year his reputation was greatly advanced by the production of *The Absurd Précieuses*, a delicate satire on the

Moline

prevailing affectation in language, thought and dress. Continuing to produce new plays and performing the chief comic parts himself, he became a great favorite, both with the court and with the people, though his enemies, rival actors and authors, were numerous. Louis XIV was so well pleased with the performances of Molière's company that he made it specially the royal company, and gave its director a pension. In 1662 Molière made an unfortunate marriage with Armande Béjart, an actress twenty years younger than himself, and this union embittered the latter part of his life.

Among his works, other than those mentioned, may be noted *The School for Husbands*, *The School for Wives*, *Don Juan*, *The Misanthrope*, *Tartuffe*, *Physician in Spite of Himself*, *The Miser*, *Scapin's Knaveries* and *The Imaginary Invalid*. Molière died of an apoplectic stroke, a few hours after playing in *The Imaginary Invalid*. Public burial was forbidden by the archbishop of Paris, on the grounds that Molière was an actor and a reviler of the clergy; but his body was laid in Saint Joseph's churchyard. A century after his death the French Academy set up in their hall a bust of him with the inscription, "Nothing is lacking to his glory; he is lacking to ours." As a player he was unsurpassed in high comic parts; and in the literature of comedy he bears the greatest name among the moderns after Shakespeare. He borrowed freely from Latin, Spanish and Italian writers, but whatever materials he appropriated he so treated them as to make the result entirely his own.

Moline, *mo leen'*, ILL., a city in Rock Island co., about 3 mi. n. e. of Rock Island, on the Mississippi River, and on the Chicago, Rock Island & Pacific and other railroad lines. Coal is mined in the vicinity. The principal manufactures are elevators, milling machinery, scales, pianos, organs, plows and other agricultural implements, wagons, engines, and foundry and machine shop products. The city has a public library, a high school library and a well-equipped hospital. Population in 1910, 24,199.

Molino del Rey, *mo le' no del ra' ee*, BATTLE OF, an important battle of the Mexican War, fought near the battlefield of Chapultepec, three miles southwest of the City of Mexico, Sept. 8, 1847. Molino del Rey consists of a number of massive stone buildings, and it was believed by the American commanders that a cannon foundry was established there. General Worth led the attack against this position and finally compelled the Mexicans to withdraw, resisting,

Mollusca

as well, the assault of reinforcements under Santa Anna. The Mexican loss was 3000 killed and wounded and about 700 captured, while the loss of the Americans was about 800, all told.

Mollus'ca, counting from the lowest, the fifth great animal subkingdom, including animals which are in most cases easily distinguished by their shell, which gives them the common name of *shellfish*. In some cases, however, the body is naked and unprotected, and in others it is enclosed in a muscular sack. The shells of the mollusks are secreted by the skin or mantle and are made up chiefly of carbonate of lime, with a small proportion of animal matter. The shells are found in an almost limitless number of forms, some of which are exceedingly delicate, beautiful in shape and marvelous in color. Many of the shells are highly useful in various ways. In some, the shells consist of a single piece, often open and cup-shaped, or like a long cone, wound spirally around an imaginary axis; in a second class, the shells are two in number and are joined by a hinge, and in a third class the shells are composed of a number of different pieces. Of the latter class there are comparatively few.

The Mollusca have a distinct alimentary canal, shut off from the general cavity of the body and lying between the blood system, which follows the back, and the nerve system, which is on the lower side of the body. The digestive system consists of a mouth, a gullet, a stomach and an intestine. The blood is almost colorless. Respiration is effected in various ways. Some species have long, hair-like arms, springing from the sides of the mouth; others are adapted to breathe air directly, but the great majority breathe through gills. The typical mollusk moves about by means of a "foot," which may be modified so as to perform various other offices, such as to burrow rapidly in the sand or to secrete strong, fibrous threads, by means of which the animals moor or fix themselves to the rocks. The foot is not developed in all species, and in the cuttlefish it is represented by the arms or tentacles around the mouth. The distinctive characteristic of the Mollusca is the nervous system, which consists of from one to three masses that give off filaments in various directions. The sense organs vary decidedly, some having highly developed eyes, while others have practically none. The eyes of the land snails, for instance, are at the end of long tentacles, which are protruded from the shell while

Molly Maguires

the animal moves about. Many species pass through a free-swimming form, during the early part of their life, after which they sink to the bottom, fix themselves to a support and grow their shells. See OYSTER; CLAM; CUTTLE-FISH; PEARL.

Molly Maguires, *ma gwire'z'*, a secret order organized about 1854 in the coal region of Pennsylvania. It was probably a branch of the Physical Force Party of Ireland and became notorious in the United States for the violence of its actions, amounting in many cases to assaults and assassinations. Irish Catholics only were admitted to membership, though through this membership they lost their standing in the Church. It was governed by a central organization, called the Board of Erin, which met about four times a year in England, Scotland or Ireland; but in America the organization was divided into local divisions, each with a "body master," or chief, at its head. The organization, after accomplishing much harm, was finally uprooted through the energy of Franklin B. Gowan, a prominent mine owner, and James McParlan, a detective. Many members of the society were tried, convicted and executed, and after 1877 the organization had little influence.

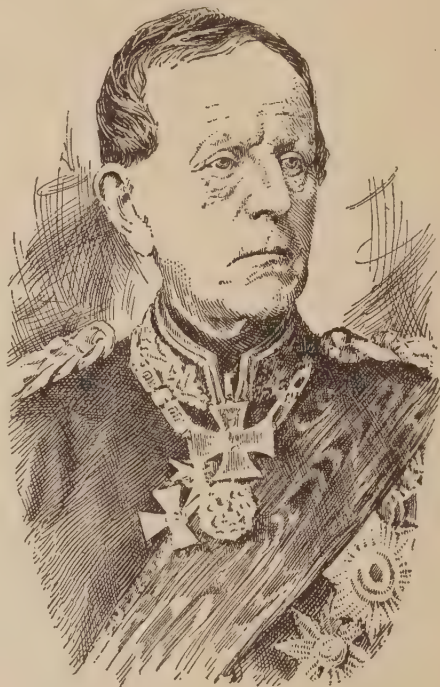
Moloch, *mo'lok*, a genus of lizards found in Australia. The moloch is a ferocious looking reptile, the horns on the head and the numerous spines on the body giving it a formidable and exceedingly repulsive appearance. It is, however, perfectly harmless. It is about six inches long and lives in sandy soil, feeding on ants.

Molokai, *mo lo ki'*, an island of the Hawaiian group, somewhat over 260 sq. mi. in area. It is noted for a settlement of lepers on its north coast. All persons on the islands found to be affected with the disease are sent by the government to Molokai and are kept entirely isolated from the healthy part of the community. Population in 1910, 2112. See LEPROSY.

Molt'ke, HELMUTH CARL BERNHARD, Count von (1800-1891), a Prussian general. He entered the Danish army in 1819, left that service for the Prussian three years later and became a staff officer in 1832. In 1835 he went to Turkey, superintended the Turkish military reforms and was present during the Syrian campaign against Mehemet Ali. He returned to Prussia, and from that time his rise was steady. In 1858, as provisional director of the general staff, he acted in unison with Bismarck

Moluccas

in the vast plans for military reorganization which so greatly increased the efficiency of the Prussian army. The success of the Danish War (1864) was attributable to him, as was also



COUNT VON MOLTKE

the success of the Austro-Prussian War of 1866; and the Franco-German War justified him in his method of drawing up a plan of campaign and directing movements from a distance, instead of joining the army in the field. In 1871 he was made field marshal, and in the following year he was given the title of count. He was retired from the position of chief of the general staff in 1888.

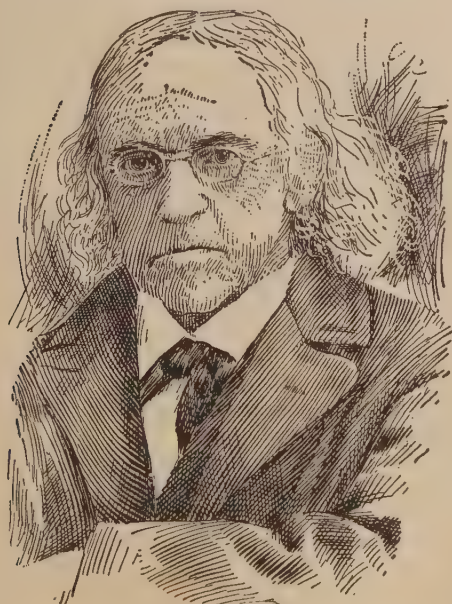
Moluc'cas or **Spice Islands**, a name applied to the widely scattered group of the Malay Archipelago lying between Celebes and Papua. The combined area of the islands is 21,516 square miles. They are divided into three residencies, Amboyna, Banda and Ternate. The southern portion is governed directly by the Dutch, while the north is ruled through native sultans. The islands are nearly all mountainous and mostly volcanic, and earthquakes are by no means uncommon. Nutmegs, cloves, coconuts, mace and sago are exported to Europe. The Moluccas have been for centuries alternately in the possession of the Spaniards, Portu-

guese and Dutch. At present they belong to the Netherlands. The natives belong to Malay and Polynesian races. Population in 1910, estimated, 400,000.

Mombasa, *mom bah'sa*, or **Mombaz**, a town on the east coast of Africa, the capital of British East Africa, in latitude $4^{\circ} 6'$ south, longitude $39^{\circ} 49'$ east, on a small island which affords one of the best harbors on the coast. The town is dirty and unhealthful, but it has a considerable trade in millet indian corn, ivory, copra, hides and rubber. Population, about 27,000.

Momen'tum, the quantity of motion possessed by a moving body. Momentum equals the mass multiplied by the velocity. A stone weighing 200 pounds and moving 20 feet per second will have a momentum of 20 times 200 pounds, or 4000 pounds. The unit quantity of momentum most commonly employed is that possessed by a body of the mass of 1 pound, moving with a velocity of 1 foot per second. The C. G. S. (centimeter-gram-second unit) is the momentum possessed by a body of the mass of 1 gram, moving with a velocity of 1 centimeter per second.

Mommsen, *mohm'zen*, **THEODOR** (1817-1903), a celebrated German historian and



THEODOR MOMMSEN

archaeologist. In 1852 he became professor of Roman law at the University of Zürich, and two years later he was given a similar position at

the University of Breslau. He went to Berlin in 1858 as professor of ancient history and remained there until his death. In the Prussian parliament, of which he was a member from 1873 to 1882, he became prominent as an advocate of liberal movements and as an opponent of much of Bismarck's policy. Mommsen's *Roman History* is accepted as a standard in its field, and it is one of the most notable contributions ever made to history.

Mom'pos or **Mompox**, a town in the Republic of Colombia, in South America, on the Magdalena River, 110 mi. s. e. of Cartagena. Founded in the sixteenth century, it was at one time of considerable commercial importance, but the changes of the river's course have seriously reduced its prosperity. Population, about 11,000.

Mom'us, in classical mythology, the god of mockery and censure, who was expelled from heaven for his free criticism of the gods. Momus is generally represented raising a mask from his face and holding a small figure in his hand.

Monachism, *mon'a kiz'm*, or **Monasticism**, *mo nas'ti siz'm*. A monastery is a house of retreat from the world, where men and women devote themselves to acts of self-denial and pious work. The occupants of such places are termed monks or nuns.

The monastic vows are three in number—poverty, chastity and obedience. The vow of poverty prevents the monks from holding any property individually. Monasteries, however, professing merely a high degree of poverty, may possess real estate, yet not more than enough for their support, as in the case of the Carmelites and Augustinians. In the higher degrees a monastery may hold only personal property, as books, dress and supplies of food and drink. The Dominicans are monks of this class. The highest degree absolutely forbids both real and personal property, as is the case with the Franciscans, especially the order known as Capuchins. The vow of chastity requires an entire abstinence from familiar intercourse with the other sex, and that of obedience, entire compliance with the rules of the order and the commands of the superior.

Monasteries were first founded by Saint Anthony, in Egypt. He came from the wilderness, where he was living in rigorous seclusion, and gave those hermits less learned than himself the benefit of his wisdom and sanctity. Nearly contemporaneous with him was Saint Pachomius (315 A. D.), who founded in the

Thebaids several monasteries of the Cenobitic order. In the beginning, each religious house had its own rule, but that of Saint Basil was ultimately adopted by the monks of western Europe. When Saint Patrick landed in Ireland, he discovered that he had been preceded by four Christian apostles, who had founded monasteries in different parts of the island. Saint Patrick founded a large number of monasteries and was emulated by many of the Irish anchorites until, in the seventh century, Ireland had monasteries which were celebrated all over Europe, not only for their sanctity, but for their learning, as well.

Western monasticism, which rapidly spread during the fifth century, was accompanied by many irregularities, until monastic vows were introduced in the sixth century by Saint Benedict, who also instituted monasteries for women. The monasteries of the West now became the dwellings of piety, industry and temperance and the refuge of learning. Missionaries were sent out from them; deserts and solitudes were made habitable by the industrious monks, and in promoting the progress of agriculture and converting the German and Slavonic nations, they rendered great services to the world from the sixth century to the ninth. Another incalculable benefit conferred upon civilization by the monasteries is the preservation of nearly the whole of the classic and medieval manuscript literature that we possess. The most famous of these great centers of piety and culture were the monasteries of Saint Gall in Germany, Saint Denis in France and Yarrow in England.

Among the most important orders for men founded in the Middle Ages were the Congregation of Cluny, the Cistercians, the Carthusians, the Franciscans and the Dominicans, on each of which a separate article will be found.

The military orders, such as the Knights Hospitalers and Knights Templars, which developed in the twelfth century, took, in addition to the usual three vows of a monk, a fourth vow of making war on the infidels, for the defense of Christendom (See KNIGHTHOOD, ORDERS OF). Among the more modern religious orders are the Capuchins and the Jesuits, which are described under their respective titles.

The earlier monastic communities for women were usually outgrowths of the orders for men. Until the seventeenth century they were nearly all cloistered communities, but now the majority of the orders take active part in charitable work among the poor, sick and ignorant. One of the oldest orders is that of the Ursuline Sisters,

founded in 1537 by Saint Angela Merici of Brescia. This is a teaching order. Their first convent in the United States was founded by French nuns at New Orleans in 1727.

Mon'aco, an Italian principality lying between the French Department of Alpes-Maritimes and the Mediterranean Sea. It is about eight square miles in area and is the smallest independent state of Europe. The principality is made up chiefly of the capital, Monaco, Monte Carlo and the village of Condamine. The town of Monaco is situated on a rocky height projecting into the sea and is a renowned watering-place; its population is about 3300. Monte Carlo, which is about a mile to the east of Monaco, consists of numerous hotels and villas which have sprung up near the gardens of the gambling casino. The prince of Monaco was formerly absolute, but since 1911 a constitution has been in force providing for a national council and a ministry to make and enforce the laws. The people are exempt from taxation, as the revenue is almost entirely derived from the rents of the gambling establishments at Monte Carlo. Population in 1910, 19,121.

Monarchy, *mon'ar ky*, a state or government in which the supreme power is vested in a single person, by whatsoever name he may be distinguished. A government in which the subjects have no right or powers as against the ruler is popularly termed *despotic*, or *absolute*, monarchy; when the ruler is subject to any law, either written or unwritten, or shares his powers with any body, the government is popularly called *constitutional*, or *limited*, monarchy (for instance, Great Britain). Monarchies are either *hereditary*, as in Great Britain, or *elective*, as was formerly the case in Poland.

Monasteries, *mon'a ster iz*. See MONACHISM.

Monbut'tu or **Mangbuttu**, a country in central Africa, extending between 3° and 4° north latitude and between 28° and 29° east longitude. Its area is about 4000 square miles, and the population is about 1,000,000. The soil is exceedingly fertile, and fine tobacco, sugar cane and other tropical crops are produced with little cultivation. The inhabitants are cannibals and practice polygamy. They have a chocolate complexion and are said to be skilful in certain arts. The garments worn by the Monbuttu are made of bark cloth.

Monday, *mun'day*, (the moon's day), the second day of the week. *Black Monday*, any Easter Monday, because on Easter Monday in

April, the forces of King Edward III suffered from cold, mist and hail as they lay before Paris. *Blue Monday* is the Monday before Lent.

Money, the term used to denote a variety of things employed in commerce to serve one or more of the following purposes: (1) as a medium of exchange; (2) as a measure of value; (3) as a standard of value. Thus, coins (See *COINING*), bars of bullion, tokens, notes, checks and due bills are all called money under certain conditions, though presenting essential differences. A brief survey of the development of the complex monetary system of modern society will give the best explanation of the elasticity and uncertainty in the meaning of the word, and at the same time it will disclose the meaning of the principal functions of money.

The first commercial exchanges took place by means of barter, but the difficulties of this system were numerous, the chief one being that it required the coincidence of mutual wants at the same time and place. It was soon discovered that a common medium of exchange, which was universally acceptable, would make such a coincidence possible with much less loss of time. Accordingly, different articles were determined upon to be used as mediums of exchange; so, skins, cattle, shells, corn, cloth, salt, wampum and many other common commodities have at different times and places been used as money in this sense. But in commerce it is not only necessary that things can be exchanged for some common substance, but the rates of exchange must be measured. Accordingly, money, or the common medium of exchange, became a measure of value; but in order that transactions in which payments are to be deferred may be just and fair, a fixed and stable standard of value is needed, and money supplied this need. In order that the primary functions of money may be fulfilled, the substance which is chosen must have certain properties, of which the principal ones are *portability*, or great value in small bulk; *durability*; *homogeneity*, that is, having the same quality throughout; *divisibility*, and *stability* of value. It was soon discovered that these qualities are possessed in the highest degree by the precious metals, gold and silver. Iron is liable to rust; lead is too soft; tin is too brittle, copper is too heavy; leather and cloth lack durability. The importance of the qualities required in money varies according to circumstances. Thus, where, as in modern society, the vast majority of

transactions are effected without the intervention of material money, portability is of comparatively small importance, while stability of value is of the greatest importance in all kinds of deferred payments.

It is necessary to notice the distinction between *standard* money and *token* money. The former may be coined to an unlimited extent and is unlimited legal tender (See *TENDER*). Token, or representative, money has neither of these characteristics and furthermore does not equal, measured by the standard money, its face value. It merely *represents*, for convenience, an amount stamped upon its face and fixed by law. With the progress of civilization, representative money has become of more and more importance and is issued in a vast number of forms. It is made of gold, silver, lead, copper and all kinds of paper certificates, which are transferable and represent definite values. It will be seen that not only government notes and certificates, but also bank notes, checks and drafts and even, under extraordinary circumstances, private notes, are money in this sense. The use of these various things as money has been extended with the development of the credit system of business (See *CREDIT*).

The *value* of metallic money is a purely relative term, depending upon its purchasing power in relation to other commodities. It accords therefore with the same law as the value of other articles, namely, the law of supply and demand, *supply* in this instance being understood to mean the whole quantity of money available for use, and *demand*, the amount of work to be done by it that is, the number of exchanges to be made by means of it. Thus, all conditions being the same, an increase in the supply of money will lower its value, and prices will show a corresponding increase, and *vice versa*. Other elements which may affect the value of metallic money are a division of labor, the use of credit and the rapidity of circulation of money, all of these factors affecting the number of exchanges which require the use of money.

Paper money is of two kinds, *convertible*, or that which is secured by metallic money for which it can be exchanged, and *inconvertible*, which is real money in itself and is purely dependent in value upon the law of supply and demand. Convertible paper money derives its value entirely from the value of the metallic money which it represents. It is therefore dependent in value upon the same conditions that regulate the value of metallic money. Paper

Money

money was originally almost wholly convertible, but as bankers and governments came to realize that the demand for metallic money at any one time would not equal the whole amount of the outstanding notes against it, they gradually issued larger and larger sums of paper money, in excess of the actual metal held in reserve. This is called *bank money*. It is still convertible, but is based upon a reserve not equal in value to the face of the paper money. It performs all the functions of standard money and declines in value only when issued in such amounts that the ability of the issuing source to redeem it comes into question.

The monetary units of various countries, with their values in United States money, are as follows:

COUNTRY	STANDARD	VALUE
Argentina	peso	\$.965
Austria-Hungary ..	crown	.203
Belgium	franc	.193
Brazil	milreis	.546
British Honduras ..	dollar	1.000
Chile	peso	.365
China	liang or tael	about .750
Colombia	dollar	1.000
Costa Rica	colon	.465
Denmark	krona	.268
England	pound sterling	4.8665
France	franc	.193
Germany	mark	.238
Greece	drachma	.193
Guatemala	peso	.485
Honduras	peso	.485
India	pound sterling	4.8665
Italy	rupee	.02163
Japan	lira	.193
Mexico	yen	.498
Netherlands	dollar	.498
Nicaragua	guilder or florin	.402
Norway	peso	.485
Panama	krona	.268
Philippines	balboa	1.000
Portugal	peso	1.500
Russia	milreis	1.080
Salvador	ruble	.515
Spain	peso	.485
Sweden	peseta	.193
Switzerland	krona	.268
Turkey	franc	.193
United States	piaster	.044
	gold dollar	1.000

See CURRENCY; BANKS AND BANKING; CLEARING HOUSE; MINT, and articles on each of the important standard coins.

Money, HERNANDO DE SOTO (1839-1912), an American lawyer, planter and politician, born in Holmes County, Miss. He was educated at the University of Mississippi, served in the Confederate army and in 1875 was chosen to the lower house of Congress, serving continuously for ten years and again from 1893 to 1897. In the latter year he was chosen to the United States Senate to fill an unexpired term and was reelected in 1899 and again in 1905.

Mongibello, *mon je bel'lo*. See ETNA.

Mongols

Mongo'lia, a vast region of northeastern Asia, a province of the Chinese Republic, situated between China proper and Asiatic Russia. Its area is estimated at about 1,200,000 square miles. A great part of the region is occupied by the Desert of Gobi, and on or near its borders are lofty mountain chains, the principal of which are the Altai, the Khangai and the Sayan. There is, however, some productive land in the region, and wheat, barley and millet are raised. The inhabitants lead a nomadic life, and their chief occupation is the grazing of large herds of cattle, sheep and horses. The climate is intensely hot in summer and bitterly cold in winter.

The population of Mongolia is estimated at about 2,000,000, but it is possibly much greater than this. See MONGOLS.

Mongolian Race or **Yel'low Race**. See RACES OF MEN.

Mon'gols, a race of Asiatics who first came into prominence under their ruler Genghis Khan, who united the rival hordes (See GENGHIS KHAN). After his death, in 1227, his sons and grandsons pursued his conquests, and in 1237 they invaded Russia, devastated the country with the most horrible cruelty and in two divisions passed into Poland and Hungary. At Pesth the Hungarian army was routed with terrible slaughter, and at Liegnitz, in Silesia, Henry, duke of Breslau, was defeated in a bloody battle, April 9, 1241 (See KUBLAI KHAN). The principal seat of the great khan was transferred to China; the other countries were governed by subordinate khans, all of whom were descended from Genghis, and several of whom succeeded in making themselves independent. The division of the empire and the adoption of new religions (Buddhism in the East and Mohammedanism in the West) were the cause of the gradual decay of the power and consequence of the Mongols in the fourteenth century. In 1368 the empire of the Mongols in China was overturned by a revolution, which set the native Ming dynasty on the throne. Driven northward to their original home, the eastern Mongols gradually split up into small independent tribes, and finally they were subdued and absorbed by the Manchu conquerors of China. Among the western Mongols appeared a second formidable warrior, Timur, also called Tamerlane, or Timur Beg (See TIMUR). After Timur's death in 1405, his vast empire held together but a short time. After the commencement of the sixteenth century, the Mon-

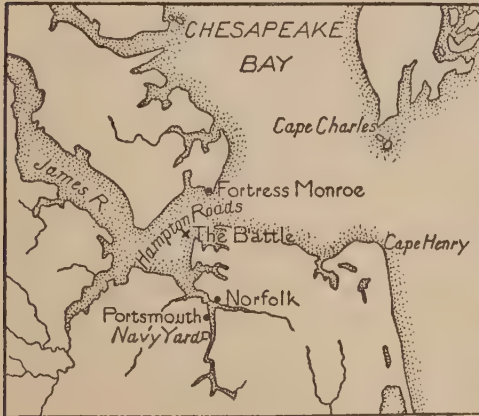
Mongoose

gols lost all importance in the history of the world, became split up into a number of separate tribes and fell under the power of neighboring peoples. Their name still lingers in the Chinese province of Mongolia (see above), but Mongolian tribes are found far beyond its boundaries.

Mon'goose or **Mungoose**, a small, reddish-gray animal which has been introduced from India into other countries for its skill in destroying rats and other vermin. It is able to kill even the most poisonous snake without injury to itself and so is supposed to be highly beneficial; but in places where it has been protected and the food supplies are good, it has increased in numbers so rapidly that harmless small animals and even poultry and domestic pets have suffered severely.

Mon'itor, the name of a genus of large lizards living in the Old World, some species of the Nile and Egypt attaining a length of six feet. They generally inhabit the neighborhood of rivers and lakes and feed upon the eggs of crocodiles, turtles and aquatic birds. The important species are the *Nile monitor*, common all over Africa, and the Ceylonese *kabara-goya*. The name *monitor* is derived from the belief formerly entertained that these lizards gave warning of the approach of crocodiles.

Monitor, **THE**, a famous ironclad war ship, constructed between October, 1861, and Janu-



HAMPTON ROADS AND VICINITY

ary, 1862, at Long Island, under the direction of John Ericsson. Its length was 172 feet, and the only portion which projected prominently above water was a turret 20 feet in diameter and 9 feet high, consisting of 9-inch armor and containing two 11-inch guns. Immediately after her launching, the *Monitor* went to Hampton

Monkey

Roads, Va., where she arrived on the evening of March 8. On the following day she met the *Merrimac*, a Confederate ironclad (See **MERRIMAC**, **THE**) which had wrought havoc among the wooden vessels of the United States fleet. After a battle of four hours, in which neither contestant was seriously injured, both vessels withdrew. This battle proved conclusively the utility of armor plate and revolving turrets upon war vessels and marked an epoch in the development of naval construction. The *Monitor* sank in a windstorm soon after the battle, while proceeding to Beaufort, N. C. The name *monitor* has been given to a class of boats built upon the plans of the original *Monitor*.

Monk, *munk*, or **Monck**, **GEORGE**, Duke of Albemarle (1608-1670), an English general, famous for the prominent part he took in the restoration of Charles II. In the struggle between Charles I and the Parliament, Monk joined the royalists; but after imprisonment he joined the Covenanters and served Cromwell faithfully and with distinction till the latter's death. Then he seems to have decided at once upon the restoration of the Stuarts. The Presbyterian members who had been driven from Parliament in 1648 were recalled, to create a majority for Charles II, and the king rewarded his restorer with the dukedom of Albemarle, the Order of the Garter and a pension.

Monkey, *munk' y*, a name given to any of the family of four-handed mammals, but generally



PIG-TAILED MONKEY

restricted to the smaller, long-tailed species. Different kinds are found in Asia, Africa and South America. Monkeys usually live in trees, and their food, which is chiefly vegetable, is stored by most species in their cheek pouches. Of the American species, all of which have 36 teeth, as against 32 in the Old World species, the *howling monkey* is the largest and fiercest, though the least intelligent. It has a long beard and a long tail. The *spider monkey*, or

Monmouth

caaitia, is the most graceful American monkey. Its tail serves as a hand, for not only can the monkey swing by it, but it has also a keen sense of touch. The *capuchin* also has a long prehensile tail, covered with hair to the tip. The *sakis* have bushy tails and short beards. The *sapajous*, the kind usually seen with organ-grinders, are smaller and are the most intelligent of American monkeys. The monkeys of the Old World have nostrils opening at the end of the nose. The only species found in Europe is the *macaque*, on the Rock of Gibraltar, but Africa and Asia have more than forty species. The *magabey*s are found in West Africa and are distinguished by a crown of backward-pointing hairs and by the white eyelids. One African monkey has a brown body, a bright, yellowish-green head, yellow cheeks and black tail and legs. See MACAQUE; APE; BABOON.

Monmouth, *mon'muth*, ILL., the county-seat of Warren co., on the Iowa Central and the Chicago, Burlington & Quincy railroads. The city is in an agricultural region which also contains valuable deposits of coal and clay. The principal manufactures are pottery and other clay products, agricultural implements and flour. There is also a considerable trade in dairy products and live stock. Monmouth College is located here, and the city also has a county library. The place was settled in 1836 and was incorporated in 1852. Population in 1910, 9128.

Monmouth, BATTLE OF, an important engagement in the Revolutionary War, fought at Monmouth, N. J., June 28, 1778. The Americans were commanded by Washington and the British by Clinton. It was in this battle that Gen. Charles Lee with 6000 men was ordered to attack and crush the left wing of the British army. Lee retreated without striking a blow, and it was only by the arrival of Washington that a disastrous rout was prevented (See LEE, CHARLES). The result was a drawn battle, though practically an American victory, and Clinton made his escape to New York.

Monmouth, JAMES, Duke of (1649-1685), the natural son of Charles II, was always acknowledged by Charles as his son. After the Restoration, he was created duke of Monmouth and was married to the daughter and heiress of the earl of Buccleuch. In 1679 he was intrusted with a command in Scotland and defeated the Covenanters at the Battle of Bothwell Bridge, but gained the disfavor of the king by his mercy

Monopoly

to the conquered and was soon afterward sent beyond seas. A few months afterward he returned without leave and became the center of the popular movement in which the lives of Lord William Russell and Algernon Sidney were sacrificed. The result to Monmouth was exile to Holland. On the accession of James II, he was induced to attempt an invasion of England. His small body of undisciplined troops was totally defeated at Sedgemoor, and the duke himself was captured and beheaded, after abject appeals to the king for mercy.

Mon'oco'tyle'dons. See BOTANY.

Mon'oma'nia, the name of a form of insanity in which the mind of the patient is absorbed by one idea or impulse and the person seems to be insane only in the one direction; in fact, in every other respect he may be of decided ability. Dipsomania and kleptomania are regarded as two varieties of monomania.

Mon'omet'allism. See BIMETALLISM.

Monon'gahe'la, PA., a city in Washington co., 30 mi. s. of Pittsburg, on the Monongahela River and on the Pennsylvania and the Pittsburg & Lake Erie railroads. Coal mining is the principal industry, and there are also glass factories, machine shops, foundries, lumber, paper and flour mills. It was settled about 1792 and was made a city in 1873. Population in 1910, 7598.

Monongahela River, one of the two rivers which unite at Pittsburg, Pa., to form the Ohio River. It is formed by the union of West Fork and Tygart's Valley rivers, in West Virginia, runs north into Pennsylvania and unites with the Allegheny at Pittsburg. Its length, not including its branches, is about 150 miles, and it is navigable for large boats for 60 miles from its mouth.

Monop'oly, the sole or exclusive right of enjoying certain privileges. In its strict sense monopoly belongs to an economic era which has passed away. During medieval times and the period that followed, exclusive rights prevailed in almost all departments. The central governments which arose on the ruins of the medieval system continued to recognize such exclusive rights, sometimes conferring on favored individuals the sole privilege of selling the most necessary articles of life, in other cases granting to great companies the monopoly of trade over immense regions of the world. Salt and coal were among the articles whose sale was thus commonly subject to monopoly. The year 1600 saw the foundation by royal charter in

England of the greatest of the companies based on the exclusive right of trade in an immense foreign market—the East India Company. The opposition to monopolies became powerful in Elizabeth's reign, and they were abolished under the Commonwealth.

The spread of freedom has tended to the abolition of monopoly, whether vested in individuals, in corporations or in companies engaged in foreign commerce. But while the monopoly of law has passed away, new tendencies toward a monopoly of fact have been setting in. Under the prevalent system, it is still the aim of the competitor to secure as far as possible the exclusive sale of the commodity in which he deals, either in the world market or over a portion of it, and when the single competitor is not strong enough to accomplish this, he seeks to attain his object by combination with a group of those engaged in the same business. The modern so-called *trust* is the outcome of such efforts; and the great danger attendant on such gigantic combinations is the establishment of a monopoly injurious to society (See TRUSTS). There are also certain monopolies, as in tobacco, retained by certain governments, for revenue purposes. It was part of the later fiscal policy of Bismarck to establish such a state monopoly in spirits. The copyright and patent laws virtually establish monopolies, but merely as an inducement for original research.

There are certain enterprises which are *natural monopolies*, that is, which of their nature preclude competition. The transportation service of a city is such a monopoly. There is a strong movement in favor of the municipal control of these enterprises (See MUNICIPAL OWNERSHIP).

Mono-Rail, SUSPENDED, a peculiar elevated railway erected between Elberfeld and Barmen, Germany. The cars are suspended from a single large rail, which is supported by steel trusses. The points claimed in favor of this system of local transportation are that there is little or no danger of derailing the cars, that the trains can be operated with less power, and that sharper curves can be used than would be possible on the ordinary two-rail system.

Mon'otype. This is the best representative of a class of machines which cast and set type singly, instead of in a line. The monotype has two distinct parts—the perforating apparatus, operated by a keyboard, and the type-casting and setting machine. The operation of the keys perforates a paper tape about four and one-half inches in width, and this perforated tape guides

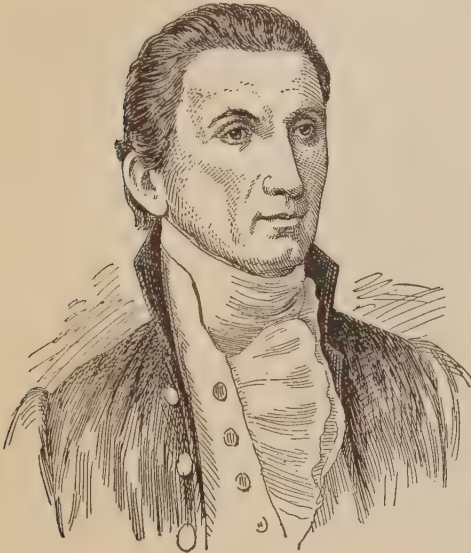
the machine in casting the type. The matrices are arranged in rows in a square frame which can move on its bed back and forth and from side to side. By these movements any matrix desired can be brought into position for casting its character. The frame holding the matrices is operated by compressed air and is brought into position by means of a series of plugs, which are pressed up or down as the perforated tape is fed into the machine. The perforations in the tape correspond to the characters required in the composition and secure the casting of these characters by elevating and depressing the plugs necessary to bring the proper matrices under the casting apparatus. The casting and setting apparatus of the monotype are quite complex, and the machine requires more than ordinary mechanical skill for its successful use. However, in the hands of a skilled operator, it does a wide range of work, as it can set a number of different sorts of type in the order called for. While the operation of the monotype is slower than that of the linotype, it is more desirable for book and magazine work, because it can set so many different sorts of type. See GRAPHOTYPE.

Monroe', LA., the parish-seat of Ouachita parish, 72 mi. w. of Vicksburg, Miss., on the Queen & Crescent route and the Saint Louis, Iron Mountain & Southern railroad and on the Washita River, which is navigable all the year. The city is in a lumbering and cotton-growing region, has a considerable trade and contains cotton compresses, cottonseed oil mills, brick-yards, lumber mills and wooden ware factories. Population in 1910, 10,209.

Monroe, MICH., the county-seat of Monroe co., 40 mi. s. w. of Detroit, on the Raisin River and on the Lake Shore & Michigan Southern, the Michigan Central, the Pere Marquette and other railroads. It has a public library, Saint Mary's Academy, an orphanage and a home for the aged; other prominent buildings are the armory, an opera house and a fine courthouse. The place was settled by a company of Canadians in 1784. During the War of 1812 it was the scene of a famous massacre (See RAISIN RIVER, MASSACRE OF). Monroe was incorporated as a city in 1836. Population in 1910, 6893.

Monroe, JAMES (1758-1831), an American statesman, fifth president of the United States of America. He was born in Westmoreland County, Va., and was educated at William and Mary College, his studies being interrupted by services in the Revolutionary army. At the

close of the war he devoted himself to the study of law, in 1782 and 1787 he was elected a member of the Virginia Assembly and from 1783 till 1786 represented Virginia in Congress. In 1788, as member of the convention of Virginia, he strenuously opposed the ratification of the new Federal Constitution, feeling that it gave the central government too much power and the states not enough, but in 1790 he accepted election to



JAMES MONROE

the Senate of the United States, where he was an ardent Anti-Federalist. From 1794 to 1796 he was minister plenipotentiary to France, being recalled for expressions of opinion which Washington considered indiscreet and dangerous. This caused bitter party feeling.

From 1799 till 1802 Monroe was governor of Virginia, and in 1803 he returned as envoy extraordinary to France with Robert R. Livingston, on a mission which resulted in the acquisition of Louisiana. He was afterward employed in diplomacy in England and Spain, but was not successful. In 1811 he was again governor of Virginia and in the same year became secretary of state, acting also as secretary of war for a time. In 1816 the Democratic-Republican party elected him to the presidency of the United States. In 1820 he was reelected, only one vote being cast against him, owing to the breaking down of party lines. He also had gained remarkable popularity by securing the cession of Florida from Spain and

by the settlement of the vexed question of the extension of slavery by the Missouri Compromise. Mexico and the emancipated states of South America were formally recognized by the American government during Monroe's second term; but its chief event was the promulgation of the "Monroe Doctrine" (See MONROE DOCTRINE). This period is known as the "Era of Good Feeling." See ERA OF GOOD FEELING.

Monroe Doctrine, broadly stated, the policy promulgated by the United States government of preventing interference by European powers in the political affairs of American nations, and, especially, its opposition to the extension of monarchical institutions in the western hemisphere. The occasion of the first definite utterance of this policy was in 1823, when it was suspected that a so-called Holy Alliance consisting of Russia, Austria, Prussia and France, aimed to interfere in America to restore to Spain the colonies which had gained their independence and had been recognized by the United States. In his message of December 2, 1823, President Monroe declared that "the American continents are henceforth not to be considered as subjects for future colonization by any European power. With the existing colonies or dependencies of any European power we have not interfered and shall not interfere. But with the governments which have declared their independence and maintained it, and whose independence we have acknowledged, we could not view any interposition for the purpose of oppressing them, or controlling in any other manner their destiny, by any European power, in any other light than as the manifestation of an unfriendly disposition toward the United States."

This doctrine has been differently interpreted at various junctures in American history, but its general spirit has been followed with scarcely an exception for three quarters of a century. Two years after its announcement it was successfully invoked to prevent Spain from transferring Cuba to France or England. The first and only important instance of disavowal or disregard of the doctrine was in the signing of the Clayton-Bulwer Treaty of 1850, in which England and America agreed not to occupy, fortify, colonize or assume any dominion over any part of Central America, but joined in guaranteeing the proposed canal across the Isthmus of Panama. By this act the United States admitted Great Britain to an equal footing with itself in an undertaking purely American in scope and character.

Monrovia

The Monroe Doctrine proved its force and efficiency soon after the close of the Civil War, when the French army, which had established the unfortunate Maximilian upon the throne of Mexico, withdrew at the suggestion of Secretary Seward, supported by a movement of American forces toward the Mexican frontier. Again in 1880 President Hayes announced, in regard to the proposed canal under French control across the Isthmus of Panama, the following policy: "No European power can intervene for such protection [of the capital invested in the canal] without adopting measures on this continent which the United States would deem wholly 'inadmissible'; this gained an avowal from the French cabinet that the government was in no way interested in the enterprise. By far the most important of recent events relating to the Monroe Doctrine was the Venezuela episode of 1894 and 1895, in which President Cleveland, by a firm avowal of a broad interpretation of the doctrine, led Great Britain and Venezuela to refer their dispute as to boundaries to a friendly arbitrator.

In recent years the interpretation of the Monroe Doctrine has been upon much more liberal lines than formerly, and it is now held by many American statesmen that it can be justified only upon the condition that American nations treat European nations honestly and candidly, and that therefore the United States is responsible to a certain extent for the international relations of smaller American republics.

Monro'via, a seaport of West Africa, the capital of Liberia, situated at the mouth of the Saint Paul River. It exports coffee, palm oil, dyewoods and rubber. It was founded in 1824 and was named after President Monroe (See LIBERIA). Population in 1910 about 8000.

Mons, *mohNs*, a town of Belgium, capital of the Province of Hainault, 35 mi. s. w. of Brussels. It was until 1862 one of the strongest fortresses of Europe, but the fortifications were then destroyed, and their site is now occupied by a boulevard. The principal buildings are the Gothic Cathedral of Saint Waltrudis, which dates from the fifteenth and sixteenth centuries; the townhall, which was built in the fifteenth century; the courthouse; a school of arts, and a library of over 70,000 volumes. The town has manufactures of linen, woolen and cotton fabrics, iron, cutlery and soap. Coal is extensively mined in the vicinity. Mons is supposed to occupy the site of one of Caesar's camps. It has figured much in history. Population in 1910, 27,904.

Montaigne

Monsoon', the name given to a certain modification or disturbance of the regular course of the trade winds which takes place in the Arabian and Indian seas. Between the parallels of 10° and 30° south latitude, the eastern trade winds blow regularly, but from the former parallel northward the course is reversed for half the year, and from April to October the wind blows constantly from the southwest. During the other six months of the year the regular northeast trade wind prevails. These winds are caused by the unequal heating of the land and sea at the different seasons, and the name is now applied to all land and sea breezes of importance, wherever they occur. See WIND.

Mon'tagu, or *munt'a gu*, MARY WORTLEY, Lady (1689-1762), an English writer, chiefly known for her brilliant letters. She was the eldest daughter of Evelyn Pierrepont, afterward duke of Kingston. In 1712 she married Mr. Edward Wortley Montagu, who two years later obtained an official position in London. Lady Mary's wit and vivacity speedily made her exceptionally popular, and she won the friendship of many of the most eminent men of her day, among them Addison, Congreve and Pope. In 1716 she was in Turkey with her husband, who was ambassador at Constantinople, and during her residence abroad she wrote her famous *Turkish Letters*. After her return to England she became involved in a quarrel with Pope, and he frequently assailed her in his poetry. Lady Mary Wortley Montagu has another claim to remembrance, namely, her adoption of the practice of inoculation for smallpox. This she learned while in Turkey, and its introduction into England was due largely to her efforts.

Mon'tague, MASS., a town of Franklin co., on the Central Vermont and the Fitchburg railroads. It includes a number of villages, among which is Turner's Falls, and it has numerous manufactures, the chief of which are cotton goods, paper, cutlery, soap and bricks. The town was settled in 1716 and was incorporated in 1753. Population in 1910, 6866.

Montaigne, *mon tane'*, MICHEL EYQUEM DE (1533-1592), a famous French essayist, born at the castle of Montaigne, in Périgord. He was a parliamentary counselor from 1557 to 1567 and at some period was appointed a gentleman of the chamber to the king. In 1571, however, he retired to his estate and devoted himself to study. In 1580 he set out on a journey through Germany, Switzerland and Italy, to

restore his health, which had been shattered by the attacks of an hereditary disease. After a last visit to Paris, he seems to have dwelt quietly in his chateau. Montaigne's essays have at all times been one of the most popular books in the French language. They embrace an extraordinary variety of topics, which are touched upon in a lively, entertaining manner, with all the raciness of strong, native good sense, careless of system or regularity. Sentences and anecdotes from the ancients are interspersed with his own remarks and opinions and with stories of himself in a pleasant strain of egotism. There is an English translation of the essays by Florio, made in 1603, and reëdited by Charles Cotton.

Montan'a, the **TREASURE STATE**, one of the northwestern states, bounded on the n. by the provinces of Alberta and Saskatchewan, Can., on the e. by North Dakota and South Dakota, on the s. by Wyoming and Idaho and on the w. by Idaho. The greatest length from east to west is 540 miles, and the average width from north to south, 275 miles. The area is 146,997 square miles, of which 796 square miles are water. The population in 1910, 376,053.

SURFACE AND DRAINAGE. The eastern part of the state belongs to the Great Central Plain, and the surface consists almost entirely of rolling prairie, which rises gradually to meet the foothills of the Rocky Mountains to the west. In this prairie region there are occasional isolated buttes, and bluffs occur along the streams. Some of these elevations have been sculptured in a wonderful manner by the winds, and are interesting objects of study. The main range of the Rocky Mountains enters the state on the north about one hundred miles east of the western boundary, and extends across the state in a southeasterly direction. To the west of this is the Bitter Root Range, which forms over half of the western boundary. Between these ranges lies a broad basin, whose surface is greatly diversified by numerous spurs and cross ranges. This region is remarkable for the beauty and grandeur of its scenery. In the northern part of the basin are the Kootenais, which extend northward across the Canadian boundary. Other ranges worthy of mention are the Mission Range, extending north and south, and the Swan Range, east of the Mission Range and nearly parallel with it and culminating in Swan Peak (10,000 feet); east of these are the Big Belt Mountains, containing a number of snow-capped peaks. Near Yellowstone National Park are a number of short ranges. The mountainous portion of

the state contains many lofty peaks, some of the most noted being Electric Peak, 11,155 feet; Mount Powell, 12,000 feet and Gallatin, 10,967 feet. Much of the mountainous region is little known, and many peaks and lakes are still without a name. Glaciers are occasionally found among these mountains, and most of the mountainous region is timbered with pine, spruce, tamarack and hardwood. On the higher slopes and summits are found the Alpine species. These are not valuable commercially, but they are useful in conserving moisture, to be used for irrigation when needed.

The principal mountain range constitutes the "Continental Divide," which separates the basin of the Missouri from that of the Columbia. That portion of the state west of the Rocky Mountains is drained by the Clark River and its tributaries into the Columbia. The region east of the mountains is drained by the Missouri, which is the most important stream in the state. It rises in the extreme southwestern part of the state and flows northerly, then easterly, till it reaches the eastern boundary. Its chief tributaries are the Yellowstone and the Mussel Shell, flowing into it from the south. The important tributaries of the Yellowstone are the Teton, the Sun, the Milk, the Marias, the Porcupine and a number of smaller streams. All of these streams flow through well-worn channels. The Missouri is navigable to Fort Benton, and the Yellowstone is navigable through the lower part of its course. The state contains only one lake of importance; that is Flathead Lake, in the northwestern county.

CLIMATE. The climate is dry and, considering the latitude of the state, milder than one at first would suppose. Like other interior regions, Montana experiences a wide range of temperature. In winter the temperature falls occasionally as low as 40° or 50° below zero, while in summer it sometimes rises to over 100° above. The mean annual temperature for the state is about 11° for the coldest month and 70° for the warmest. The chinook winds (See CHINOOK) give the region over which they blow much milder winters than it would otherwise have. Because of the dryness of the atmosphere, the changes in temperature are not felt to as great an extent as they are in regions near large bodies of water. The rainfall is light, averaging about 12 inches for the state. In the northwestern part of the state there is usually enough moisture for successful agriculture; but in other

parts irrigation is advantageous, if not absolutely necessary.

MINERAL RESOURCES. Montana is one of the richest states in minerals, and the development of its mines has been its leading industry. The state contains large deposits of bituminous and lignite coal, copper, gold, silver and precious stones. The great copper region is around Butte and Anaconda. Butte is the largest mining center in the world, producing in copper alone over 4,500,000 tons per year. Montana leads in the production of copper, its yearly output being over one-third of that produced in the United States (See COPPER). Silver and gold are mined in numerous localities, and since the discovery of these metals in the state, Montana has produced many million dollars' worth. The bituminous coal is of good quality, and its annual production is constantly increasing; the mining of sapphires has also become an important industry.

AGRICULTURE. The extensive use of dry farming has brought under tillage large areas of fertile soil in addition to that in the irrigated districts. Under both methods abundant crops are raised, and agriculture is making great progress. The region is also well suited to raising live stock. Montana leads in the raising of sheep and the production of wool, its annual output of wool exceeding 26,000,000 pounds. The bunch grass and buffalo grass found on these plains are remarkably nutritious and well suited to fattening stock, and because of the mild climate in most regions stock can run at large through the winter without protection; hence, the eastern portion of the state is largely devoted to the live stock industry. The western part of the state between the mountains usually has sufficient rainfall for agricultural purposes, though here irrigation is of great advantage. The chief crops are hay, oats, wheat, barley and potatoes. In the mountain valleys are found large orchards, as this region is remarkably well suited to the raising of apples and other orchard fruits. Horticulture is here becoming an important industry.

MANUFACTURES. The principal manufactures are directly or indirectly connected with the mining industries. The most important manufacturing industries consist in the smelting and refining of ore and the production of lumber. The greatest smelting works are located at Anaconda, Butte, Great Falls and East Helena. Lumber is manufactured extensively at Hamilton, Bonner and other points. Coke is manu-

factured in the vicinity of the coal mines and is used in the smelters. There are also numerous breweries; in some localities slaughtering and meat packing have been commenced, and the manufacture of flour and gristmill products is quite general. The chief agricultural sections are the valleys of the Bitter Root, the Flathead, the Yellowstone and the Gallatin. The latter valley produces the finest barley in the world.

TRANSPORTATION. Three great trunk lines of railway cross the state from east to west; the Great Northern in the north, with a branch from Havre to Butte; the Chicago, Milwaukee & Puget Sound in the center and the Northern Pacific in the center and south. The Oregon Short Line enters the state from the south and extends to Butte, and the Chicago, Burlington & Quincy connects with the Northern Pacific at Livingston. Numerous branch lines connect with these trunk lines, and give the portions of the state through which they pass good railway facilities. Although the railway mileage within the state is increasing each year, between these lines there are areas yet without railway communication, and stages are the only means of conveyance. In the remote mountain regions pack animals are in general use for conveying supplies, and on streams, ferry boats and other craft are employed wherever they can be used to advantage.

GOVERNMENT. The state legislature consists of a senate of 29 members, elected for four years, and a house of representatives of 73 members, elected for two years. The legislature meets every two years, the session being limited to sixty days. The executive department consists of the governor, the lieutenant governor, the secretary of state, the attorney-general, the treasurer, the auditor and the superintendent of public instruction, each elected for four years. The courts consist of a supreme court of three judges, elected for six years, and such district courts as may be created by the legislature, each district having one or more judges elected for four years. The local administration is by counties; it is in the hands of three commissioners for each county and the other usual county officers.

EDUCATION. The public school fund is obtained in large part from the sale and lease of school lands. This is supplemented, also, by state and local taxation. The state has a strict compulsory education law, and the school system provides for the establishment of common schools and county high schools when-

ever there is a demand for them. Over half of the counties now have county high schools, and there are also high schools in all the important cities. The University at Missoula is at the head of the educational system. There is a state normal school at Dillon, an agricultural college at Bozeman and a school of mines at Butte. There are also a number of colleges and secondary schools maintained by religious denominations.

INSTITUTIONS. The school for the deaf and blind is at Boulder, the state orphans' home is at Twin Bridges and the state soldiers' home is at Columbia Falls. There is no state hospital for the insane, their care being provided for by private contract. The hospital is at Warm Springs, the penitentiary is at Deer Lodge and the reformatory is at Miles City.

CITIES. The chief towns are Helena, the capital; Butte, Great Falls, Anaconda, Missoula, Bozeman, Billings, Livingston, Kalispell and Miles City, each of which is described under its title.

HISTORY. The territory of Montana was first visited by the French in 1742, and later by Jesuit missionaries, fur traders and trappers. Most of it was included in the Louisiana Purchase of 1803, and it was explored by Lewis and Clark in 1805. The first permanent settlement was at Fort Benton in 1840. In 1861 rich gold fields were discovered, and the following year mining began in earnest. The territory was organized in 1864, being formed of a part of the old Territory of Idaho. In 1876 the famous Custer massacre occurred on the Little Bighorn River. The development of silver and copper mines and the construction of railroads brought prosperity to the region, and in 1889 Montana was admitted into the Union. Consult Bancroft's *Idaho and Montana*.

Montana, **UNIVERSITY OF**, a state university, opened at Missoula in 1895. It now has departments of biology, chemistry, English, fine arts, history, economics, forestry, classics, literature, mathematics, modern languages, music, philosophy, education, physics, geology, public speaking, physical culture and engineering. The university also maintains a summer biological station. The income is derived from a grant of land, made by Congress in 1892, and from state appropriations. There are thirty members on the faculty, and over 300 students.

Mont Blanc, *mohN blahN*, (white mountain), a celebrated mountain, the highest in Europe, belonging to the Pennine chain of the

Alps, situated on the frontiers of France and Italy and near that of Switzerland. Its height is about 15,781 feet. The main portion of the mountain and the highest summit are in France. The huge mountain mass is about 30 miles long, about 10 miles wide and has numerous summits, some rounded, some sharp. On the southeast, its face is steep; on the northwest, lateral chains are sent off. The highest summit is always covered with a great ice cap, from which glaciers extend in all directions. Of these glaciers, the most famous is the Mer de Glace. The summit of Mont Blanc was first reached in 1876 by Jacques Balmat, a mountain guide.

Montcalm de Saint-Veran, *mohN kahlm' de saN va rahN'*, LOUIS JOSEPH, Marquis de (1712-1759), a French general. He entered the army in 1726, distinguished himself in several campaigns in Europe and in 1756 was appointed to the chief command of the French troops in Canada. His brilliant success began with the capture of Fort Ontario, and he afterward took Fort William Henry, on Lake George, and occupied Ticonderoga, which he successfully defended against a greatly superior force of British. He then withdrew to Quebec, where he prepared to meet the British in a decisive conflict. In July, 1759, the attack began, and the British were at first repulsed; but Wolfe led his forces to the Heights of Abraham, a plateau above Quebec, and there the two armies met. At length the French were driven back, and in the final charge both Wolfe and Montcalm were mortally wounded. Montcalm's last words were, "Thank God, I shall not live to see the surrender of Quebec."

Mont Cenis, *mohN se ne'*, **Tunnel**. See CENIS, MONT, TUNNEL OF.

Mont Cervin, *mohN ser vaN'*. See MATTERHORN.

Montclair, N. J., a town in Essex co., 5 mi. n. w. of Newark, on the Lackawanna and the Erie railroads. It is a beautiful residence place, being located on one of the ranges of the Orange mountains, at an average elevation of about 300 feet, affording a good view of New York City and harbor. The town has a hospital, two orphan asylums, a public library, Montclair Military Academy and a good high school. It was first incorporated as a separate town in 1868. Population in 1910, 21,550.

Mon'te Carlo, *kahr'lo*. See MONACO.

Mon'te Cris'to, a small island in the Mediterranean, located about 26 mi. s. of Elba and belonging to Italy. It is the seat of a penal

Montefiore

colony. Dumas made this island famous through *The Count of Monte Cristo*.

Mon'tefio're, MOSES, Sir (1784-1885), a Jewish philanthropist. In 1837 he was chosen sheriff of London, the same year he was knighted, and in 1846 he was made a baronet. His benevolence to Jews throughout the world was unbounded, and he visited Palestine seven times, the last time at the age of ninety-two.

Montenegro, *mon ta na' gro*, (black mountain), an independent kingdom in Europe, northwest of Turkey, bounded by Herzegovina, Albania, the Adriatic, Dalmatia and the Turkish sanjak of Novipazar. Its area is about 3600 square miles, or three-fourths that of Connecticut. The surface is everywhere mountainous, being covered by an extension of the Alps, which rise in places to a height of over 8000 feet. There are, however, a few beautiful plains and valleys, in which the soil is tolerably fertile. The principal streams are the Moratcha and the Zeta, which join and empty into the lake of Scutari, on the border between Montenegro and Albania. The climate of Montenegro is healthful. Forests of beech, pine, chestnut and other valuable timber cover many of the mountain sides, and fruit trees of all kinds abound, especially in the sheltered valleys, where almonds, vines and pomegranates ripen. Agriculture is in a very primitive state, though every piece of land which can be cultivated is planted with cereals, tobacco, potatoes, rye or some other useful plant. Sheep, cattle and goats are raised in large numbers, and the chief occupation, besides stock raising, is fishing. Trade is left almost altogether to foreigners, and manufactures, with the exception of a coarse woolen stuff, are unknown. The exports are sheep and cattle, sumac, honey and hides.

The Montenegrins are of the Servian race and speak a Servian dialect. They are generally tall and well-proportioned. The men are at almost all times fully armed, whatever be the occupation in which they are engaged, and all between fourteen and fifty years of age are liable to military service. In religion they are of the Greek Church. Education, once neglected, is now free and compulsory. The government is nominally a constitutional monarchy, but the prince is practically absolute. The chief towns, which are in reality little more than villages, are Cetinje, the capital; Podgoritz, Nikshitch, Dulcigno and Antivari.

The history of Montenegro for many years is a record of deadly struggles with the Turks

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and of a slow-growing civilization among the inhabitants. From the early part of the sixteenth century the ruler of the country was the vledika, or prince-bishop, but in 1855 the vledika Danilo threw off his ecclesiastical character, took the title of prince and transformed his land into a secular principality, the independence of which was soon recognized by Russia. Danilo was assassinated in 1860, and Nicholas I became prince. In 1862 he engaged in a war against Turkey which proved not altogether successful, but in 1876 Montenegro again went to war with Turkey, and by the Treaty of Berlin it gained almost 2000 square miles of territory. In 1910, on the fiftieth anniversary of his accession, Nicholas assumed the title of king, with the approval of the national assembly. In 1912, Montenegro joined the other Balkan States in a war against Turkey, and as a result of this and of the war against Bulgaria gained territory to the extent of 2000 square miles. (See BALKAN WAR.) In 1914 Montenegro joined Serbia in the war against Austria. See WAR OF THE NATIONS; AUSTRIA-HUNGARY, subhead *History*; SERBIA. Population, 425,000.

Monterey, *mon ta ray'*, a city of Mexico, capital of the State of Nuevo Leon, about 100 mi. from the Texas frontier. It is a well-built city, with some fine buildings and well-kept streets. It has a considerable transit trade and manufactures woolen goods and carriages. Population in 1910, 81,006.

Monterey, BATTLE OF, an important battle of the Mexican War, fought Sept. 21, 1846, between an American force of 6700 men, under General Taylor, and a Mexican force of 10,000, under General Ampudia. The battle continued for three days, the Americans under General Worth finally compelling the Mexicans to surrender, though with extraordinary honors. The terms of the capitulation caused much discussion.

Montessori, MARIA (1870-), an Italian teacher whose methods have recently made a great stir in the educational world. She received a thorough medical training, and was the first woman ever granted the degree of Doctor of Medicine by the University of Rome. After her graduation she became intensely interested in work among mentally defective children, and a course of lectures which she delivered on the subject led to the establishment in 1898 of the so-called *Scuola Ortofrenica*, or "mind-straightening school," of which she was for two years director. Her results with feeble-minded chil-

Monteverde

dren were looked upon as little short of miraculous, and she herself began to feel that methods which were so successful with defective children might benefit normal children also. After studying experimental psychology for a time in the University of Rome, she took charge of the



MARIA MONTESSORI

casa dei bambini (children's houses), or infant schools, in the model tenements which the Good Building Association had erected in the slums of Rome. Interest in the methods which she has employed there has been widespread, and her writings have been eagerly read. Best known of these is *The Montessori Method*. In 1914 Doctor Montessori lectured in the United States. For a discussion of the principles governing her work, see the Kindergarten department in Vol. V.

Monteverde, *mon ta vair dai*, CLAUDIO (1567-1643), one of the earliest of great Italian composers. He contributed much to the science of harmony, was a pioneer in the construction of operas and practically revolutionized instrumentation. His principal works were the operas *Orfeo* and *Arianna*. See MUSIC; OPERA.

Montevideo, the capital of Uruguay, situated on a peninsula on the north coast of the estuary of the Rio de la Plata, 120 mi. e. s. e. of Buenos Ayres. It is one of the best-built towns of South America and has an exceptionally fine climate. The principal buildings are the cathedral, the town house, the castle, the government building, a national museum and several theaters. There is a university which

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has about 700 students. The commercial development of Montevideo, considerable as it is, has been much retarded by the shallowness of the harbor, which according to plans made in 1899 has of late been much improved. Extensive dry docks have also been constructed recently. The chief exports are hides, wool, tallow, dried beef and other animal products. The chief imports are cottons, hardware and other manufactured articles. Montevideo sends out above half of the exports of Uruguay and receives all but a small fraction of the imports. Population in 1909, 291,465.

Montezuma, the Aztec emperor of Mexico when Cortez invaded the country in 1519. Influenced by an ancient prophecy, he at first welcomed the Spaniards; but when he discovered that they were not supernatural beings, he secretly took measures for their destruction. Cortez, on learning this, seized Montezuma and compelled him to recognize the supremacy of Spain. The Aztecs immediately rose in revolt and refused to be quieted by the appearance of Montezuma. While urging them to submission, he was struck on the temple with a stone and fell to the ground. Cut to the heart by his humiliation, he refused all nourishment, tore off his bandages and soon after expired. See AZTEC; CORTEZ, HERNANDO.

Montfort, SIMON DE, Earl of Leicester (about 1208-1265), an English statesman, famous in the constitutional history of England. Although born in France, he identified himself with the English barons when they rose against Henry III and demanded the redress of grievances. Under the leadership of Montfort, the barons were able to wrest from the king a promise to abide by the measures known as the Provisions of Oxford. When the pope absolved Henry from his agreement, Montfort objected and Louis IX of France was chosen as arbiter. Again the question was decided in favor of Henry, and in 1264 the nobles under Montfort took arms to compel the king to carry out his promises. The king was defeated at Lewes, was made prisoner and was compelled to make even more humiliating terms with the barons than had been made by the Provisions of Oxford. As virtual ruler of the country, Montfort summoned an assembly in 1265 which is memorable as the first Parliament at which representatives of the boroughs were present.

Montgomery, *mont gum'ur y*, ALA., the capital of the state and the county-seat of Montgomery co., 180 mi. n. e. of Mobile and 96 mi. s. by

Montgomery

w. of Birmingham, on the Alabama River and on the Louisville & Nashville, the Mobile & Ohio, the Atlantic Coast Line and other railroads. The city is situated on red clay bluffs and is surrounded by the famous black belt, which is productive of cotton, grain and many kinds of fruits and vegetables. Among the prominent structures are the state capitol, a fine Confederate monument, the city hall, the Federal building and Estelle Hall, which is historically interesting from its many political gatherings. There is also a state normal school, a Baptist academy, La Grange Academy and the Montgomery Industrial School for Girls.

The city is an important market for raw cotton and contains many cotton factories. Forests of yellow pine and deposits of coal, iron and clay are found in the vicinity, and some of the important establishments are foundries, railroad car and repair shops, brickyards, marble works and various factories. New Philadelphia was founded in 1817; East Alabama Town in 1818, and the two were united to form Montgomery in 1819. It was incorporated as a city in 1837, and nine years later it succeeded Tuscaloosa as the state capital. It was the seat of the Confederate government from February to May, 1861. Here the first Confederate congress assembled. Population in 1910, 38,136.

Montgomery, RICHARD (1736-1775), an American general, born in Ireland. After serving with credit in the English army and distinguishing himself during the last French and Indian war, he emigrated to New York, and in 1775 he was a delegate to the first provincial convention. At the outbreak of the Revolution he was given a command in the Continental Army, was made second in command in an expedition to Canada and succeeded in capturing Montreal. He was killed during an attack on Quebec.

Month, *munth*, a period of time derived from the motion of the moon, generally one of the twelve parts of the calendar year. The calendar months have from 28 to 31 days each, February having 28, April, June, September and November, 30, the rest, 31. *Month* originally meant the time of one revolution of the moon, but as that may be determined in reference to several celestial objects, there are several lunar periods known by distinctive names. Thus, the *anomalistic month* is a revolution of the moon from perigee to perigee; average, 27 days, 13 hours, 18 minutes, 37.4 seconds. The

Montpellier

sidereal month is the interval between two successive conjunctions of the moon with the same fixed star; average, 27 days, 7 hours, 43 minutes, 11.5 seconds. The *synodical*, or *proper lunar month* is the time that elapses between new moon and new moon; average, 29 days, 12 hours, 44 minutes, 2.9 seconds. The *solar month* is the twelfth part of one solar year, or 30 days, 10 hours, 29 minutes, 5 seconds.

Monticello, *mon te sel' lo*, the name given by Thomas Jefferson to his home and estate in Albemarle County, Va., about 3 miles east of



MONTICELLO

Charlottesville. The mansion was first occupied in 1770, while still under construction, and it was planned by Jefferson himself. It was his home for fifty-six years, until his death.

Montpelier, Vt., the capital of the state and the county-seat of Washington co., 40 mi. s. e. of Burlington, on the Winooski River and on the Central Vermont, the Montpelier & Wells River and other railroads. The city contains a handsome capitol, a granite structure built in the form of a cross and surmounted by a dome rising to a height of 124 feet. It also contains the Heaton Hospital, the state library, Wood Art Gallery, Kellogg-Hubbard Library, Montpelier Seminary and a state arsenal. There is a large trade with the surrounding country, and the principal industries are granite dressing and the manufacturing of saddlery, hardware and machinery. The place was first settled by people from Massachusetts in 1787, was made a town four years later and became the capital of the state in 1805. It was chartered as a city in 1894. Population in 1910, 7856.

Montpellier, *mohN pel lyay'*, a city of France, the capital of the department of Hérault, 76 mi. w. n. w. of Marseilles. It is one of the most beautiful towns in southern France and is

located in a rich and fertile district. Since the twelfth century it has been famous for its school of medicine, said to have been founded by Arab physicians driven out of Spain. The botanical garden, begun under Henry IV, is the oldest in Europe. Among the buildings most worthy of note are the cathedral, built during the fourteenth century; the episcopal palace, now occupied by the school of medicine; the theater, the exchange, and the university buildings. Montpellier has manufactures of cotton and woolen goods, candles, chocolate, soap, chemicals, perfumes and spirits. It carries on an active trade, *Cette* serving as its harbor. The city was a stronghold of the Huguenots and suffered much in the religious wars. Population in 1911, 80,230.

Montreal, *mon tre awl'*, the largest city and the commercial metropolis of the Dominion of Canada, situated on the island of Montreal, formed by the mouths of the Ottawa, where it empties into the Saint Lawrence. Montreal is built upon the southern side of the island, 180 miles southwest of Quebec. Behind the town rises Mount Royal (Mont Réal), from which it derives its name, and a part of which is reserved as a public park. Situated at the junction of the inland and the ocean navigation, the city has a harbor with three miles of wharfage, accessible to steamers of the deepest draught. There are numerous lines of steamships which have their Canadian headquarters at Montreal. It is also the chief terminus of the Grand Trunk railway and the eastern terminus of the Canadian Pacific railway.

The city, which is one of the most attractive in Canada, contains many handsome public buildings and is divided into distinctly marked English and French quarters. The chief public buildings are the courthouse, Bonsecours Market, the customhouse, the city hall and the postoffice. The principal churches are the Cathedral of Saint James, constructed on the model of Saint Peter's at Rome; the Church of Notre Dame de Lourdes, the largest in America, and the Church of Saint Gabriel. The exports are chiefly the products of the country, such as grain, flour, cheese and lumber, and there is a large trade in furs. The principal imports are cottons, woollens and silks, iron and hardware, tea and sugar. Among the industrial establishments of Montreal are iron foundries, distilleries, breweries, sugar refineries, soap and candle work; and there are manufactures of cotton, silk, boots and shoes, paper, carpets,

tobacco, hardware, edge tools, floor cloth and carriages.

Montreal was founded, under the name of Ville Marie de Montréal, in 1642, on the site of the Algonquin village, Hochelaga. It came into the hands of the English in 1760, when it was taken from the French by General Amherst. It was the seat of government of Lower Canada until 1849, in which year it was superseded by Quebec. Population in 1911, 470,480.

Montreal, an island of Canada, in the Saint Lawrence River, at its junction with the Ottawa. It is about 30 miles long and 10 miles broad and contains the city of Montreal. The surface is generally level, and the soil is for the most part fertile and well cultivated.

Montrose, *mon troze'*, JAMES GRAHAM, First Marquis of (1612-1650), a Scottish general. At the outbreak of the war against Charles I, he was on the side of the Covenanters, because he fancied he had been slighted by the king, but in 1639 he was one of the leaders who were appointed to confer with Charles I, and after that he went over to the royalist side, was created a marquis and was made commander of the royal forces in Scotland. With an army partly composed of Irish and Highlanders, he gained several battles in rapid succession and captured Dundee and Edinburgh; but he was defeated by David Leslie. He fled to the continent, and in 1650 he landed in Orkney with a small body of followers. He failed, however, in raising an army, and a few months later he was taken and hanged.

Moody, DWIGHT LYMAN (1837-1899), an American evangelist, born in Northfield, Mass. At the age of nineteen he engaged in missionary work. During the Civil War and afterward, he was a conspicuous missionary agent of the Y. M. C. A. in Chicago, where a large non-sectarian church was organized, with Moody, though not ordained, as its pastor. He met with phenomenal success. In 1873, accompanied by Ira D. Sankey, he visited Europe, where their services resulted in great religious awakenings. In 1879 Moody opened a seminary for girls at Northfield, Mass., and in 1881 a seminary for boys. He also organized a summer school in 1890.

Moody, WILLIAM HENRY (1853-), an American lawyer and politician, born at Newbury, Mass. He graduated at Phillips Academy, Andover, Mass., and at Harvard University, afterward entering the law. He was appointed United States district attorney in 1890 and was later chosen to Congress, serving four terms.

Moon

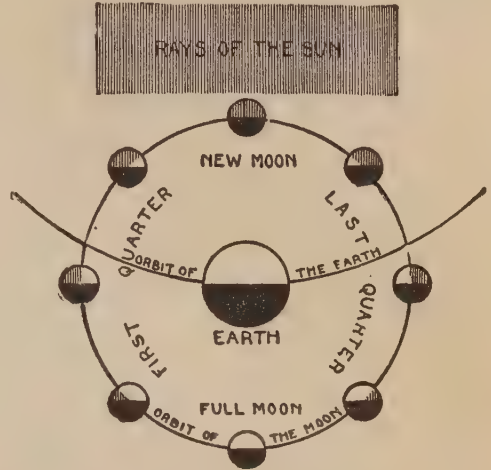
He was secretary of the navy and attorney-general in President Roosevelt's cabinet and from 1906 to 1910 he was associate justice of the Supreme Court.

Moon, the satellite of the earth, revolving round the latter in an almost circular orbit, thus accompanying the earth in its revolution round the sun. The mean diameter of the moon is about 2160 miles, or $\frac{1}{4}$ that of the earth. Its surface is about $\frac{1}{18}$ that of the earth; its volume, $\frac{1}{81}$; its mass, $\frac{1}{81}$, and its mean density a little more than $\frac{1}{2}$. A mass weighing one pound on the earth's surface would weigh less than three ounces on the moon's surface. No other heavenly body excepting meteors is so near to us. The average distance of the moon from the earth is about 240,000 miles. While the moon is making a revolution around the earth, it turns once on its axis and, accordingly, it always presents the same side to us. Exactly 27 days, 7 hours, 43 minutes and $7\frac{1}{2}$ seconds, known as the sidereal month, are required for this revolution. The lunar month, or the time from one new moon to another, is a little more than 2 days longer.

The moon is a dark globe and receives all its light from the sun. This light reflected toward us makes the moon visible. When the moon is between us and the sun, its dark side is toward us, and it is invisible. This is the period of the new moon. When the moon has moved to a point at right angles with the sun, it is in the middle of its first quarter and we see one-half of the side of it. When it is fully behind us, we see the full moon, or one-half of the moon's surface. When it is again moved to a right angle, we see again a quarter of the moon's surface. The *new moon* is the thin crescent seen in the west. If the sky is clear, we may then see the entire circle of the moon, the dark parts shining dimly by light reflected from the earth to the moon. The changes in the appearance of the moon are known as phases. A study of the accompanying diagram will make the causes of the different phases of the moon clear, if the reader will remember that the source of light is in the rays of the sun above the cut, and that the portions of the moon which are visible on the earth are white and the invisible parts are black. An eclipse of the moon occurs when it passes into the earth's shadow; when it prevents the sun being seen, there is an eclipse of the sun (See ECLIPSE). With the naked eye we can see dark objects on the moon, often said to resemble the continents of the earth and also likened to

Moon

the face of a man, "the man in the moon." Viewed through a telescope, the surface of the moon is seen to be dotted by mountains, many of which have been named after eminent scientific men. They are sometimes detached in precipitous peaks, but more frequently they form vast continuous ranges. The most prevalent



PHASES OF THE MOON

form is that of the crater, sometimes eight to ten miles in diameter and showing evident traces of volcanic action. These craters look like circular forts, with walls sometimes two or three miles high. The interior of these rings is not usually flat and smooth, and oftentimes a mountainous coue rises from the center. Certain crater-like formations which have still greater diameter are generally spoken of as walled plains. Larger still are the gray plains which were at one time taken for seas, before the absence of water from the lunar surface was demonstrated. They may possibly be the floors of old seas. Some of the mountains have been estimated to be over 24,000 feet in height. Other peculiar ridges of comparatively small elevation extend to great distances, connecting different ranges or craters. There are also valleys of various sizes, and "faults," or closed cracks, sometimes of considerable length. In reading descriptions of the appearance of the moon, it should be remembered that the highest telescopic power yet applied to that planet is only equivalent to bringing it within about 40,000 miles of the naked eye.

As the moon rotates so slowly on its axis, its days and nights are each about 14 of our days long. During the lunar day the heat must be

intense, and during its night, the cold is equally severe. No astronomer has ever been able to detect any water on the moon or any moisture or air surrounding it. With no water or air, human beings cannot exist on the moon; few changes of any sort can take place.

The influence of the moon on the earth and its affairs has always been thought to be great. At one time it was supposed to govern the weather; the time of planting and harvesting were regulated by its phases, and man superstitiously looked to the moon to regulate his affairs. While such things are believed no longer, it is known that the moon does exert remarkable physical influences on the earth. See TIDES.

Moon'stone, a whitish variety of feldspar. See FELDSPAR.

Moore, JOHN, Sir (1761-1809), a celebrated British general, born at Glasgow. He had seen considerable service in the West Indies, Ireland, Holland and Egypt before 1808, when he was appointed commander in chief of the British army in Portugal, to operate against Napoleon. The failure of the Spanish army to coöperate heartily with him rendered many of his plans ineffective, but he advanced to Salamanca in spite of the gravest difficulties, only to learn of the fall of Madrid and the advance of a great army under Napoleon. He retreated to Coruña, a distance of over two hundred miles, but there found himself obliged to face Soult. The English army was victorious, but Moore was killed in the battle.

Moore, THOMAS (1779-1852), an Irish poet, born in Dublin. From Trinity College, Dublin, he passed in 1799 to the Middle Temple in London, nominally to study law; but he almost immediately showed his preference for literature, and his *Anacreon* was published not long after his arrival in London. His next venture, the *Poetical Works of the Late Thomas Little*, though partly written in a licentious vein, which he afterward regretted, increased his reputation; and in 1803 he obtained the office of registrar of the admiralty court at Bermuda. Moore went out, but almost immediately appointed a deputy and returned to England. In 1806 he published his *Odes and Epistles*. In 1807 Moore agreed to write words for a number of Irish national airs, arranged by Sir John Stevenson. In these *Irish Melodies*, which were not finished till 1834, he found the work for which his genius was peculiarly fitted, and it is on them that his poetic reputation will mainly rest. His most

ambitious work, the Eastern romance of *Lalla Rookh*, was published in 1817 and brought its author \$15,000. The *Life of Sheridan* was produced in 1825, and *The Epicurean*, a prose romance, in 1827. Next came the *Life of Lord Byron*, for which he received nearly \$25,000, and the *Life of Lord Edward Fitzgerald*. His remaining works include *The Twopenny Post Bag*, lampoons on the prince-regent and his supporters; the humorous verses called *The Fudge Family in Paris*; *The Loves of the Angels*, and a *History of Ireland*.

Moors, a Mohammedan, Arabic-speaking race of mixed descent, forming part of the population of the Barbary States. The modern Moors have sprung from a union of the ancient inhabitants of this region with their Arab conquerors, who appeared in the seventh century. As the Mohammedan conquerors of the Visigoths in Spain (711-713) came from North Africa, the name Moor was also applied to them by Spanish chroniclers, and in that connection it is synonymous with Arab and Saracen. These Moors pushed northward into France, until their repulse by Charles Martel at the great Battle of Tours, in 732, after which they practically restricted themselves to Spain south of the Ebro. Here, for centuries, art, science, literature and chivalry flourished among them, while the rest of Europe was still in the Dark Ages. Their internal dissensions and divisions, however, weakened them in face of the new Christian kingdoms of Aragon and Castile, and before the close of the thirteenth century their possessions were limited to the kingdom of Granada (See ALHAMBRA). This, too, was finally subdued by Ferdinand, in 1492; and while great numbers of the Moors emigrated to Africa, the remainder, under the name of Moriscos, assuming in great part a semblance of Christianity, submitted to the Spaniards. Philip II, however, excited a sanguinary insurrection among the Moors in 1568-1570, which was followed by the banishing of many thousands, and Philip III completed the work in 1610 by finally expelling the last of these, the most ingenious and industrious of his subjects. The expulsion of the Moors was one of the chief causes of the decadence of Spain; for both agriculture and industries fell into decay after their departure. The expelled Moors founded cities in Africa, and these developed into the states of Barbary, whose piratical depredations ceased only in the nineteenth century.

Moose, the largest animal of the deer family now living. A full-grown moose stands six feet high and sometimes weighs twelve hundred pounds, or as much as an average sized horse. The antlers are broad and flat, with a number of prongs. The moose is clumsy, but it is fleet of foot and is a dangerous foe when at bay.



HEAD OF MOOSE

In winter the animals herd together, and in the summer they scatter and are found around lakes and streams.

Moosehead Lake, a lake in Maine, on the border of Somerset and Piscataquis counties. Its length is about 35 miles, its width from 1 to 10 miles. The Moose River and several other streams empty into the lake, while its outlets are the Kennebec River and the Penobscot River. The lake is navigable for steamboats. It is visited annually by many fishermen.

Moose Jaw, a city of Saskatchewan, Canada, at the junction of Moose Jaw River and Thunder Bay Creek. It is in the heart of the greatest wheat belt of Canada and is a large industrial center, the most important plants being flour mills, slaughter houses and bridge and iron works. The city is served by the Canadian Pacific, Canadian Northern and Grand Trunk Pacific Railways. Population in 1911, 13,823.

Moosewood. See LEATHERWOOD.

Moraine, *mo rain'*, masses of rock and gravel carried and deposited by a glacier. As the glacier proceeds down its course these masses

of rock and gravel accumulate until they form fairly regular walls. These walls constitute the *lateral moraine* of the glacier. When two or more glaciers flow in the same ravine, the moraines on the inner sides of these unite to form a *medial moraine*. As the glacier melts at its lower extremity, it deposits the rock and forms the *terminal moraine*. This continues to increase in size while the others continue to diminish. See GLACIERS.

Moravia, a northwestern province or crown-land of Austria-Hungary, bounded by Austrian Silesia, Hungary, Lower Austria, Bohemia and Prussian Silesia. Its area is 8578 square miles. It consists of a plateau almost entirely bordered by mountains. The minerals are of considerable importance and include iron, coal, graphite and slate. The chief crops are rye, oats, barley, potatoes, flax and sugar beets. Fruit is very abundant, and large quantities of wine are annually produced. Sheep and cattle are raised in large numbers. Moravia is the most important manufacturing province of the Empire, after Austria proper and Bohemia. Its woolen industries are of world-wide fame, and linen and cotton, beet sugar, iron and steel goods, machinery, beer and spirits are also produced in large quantities. The government of the province consists of a governor and a diet. The rule of Austria in Moravia began in 1526. About seventy per cent of the inhabitants of Moravia are Slavs, and almost all the remainder are Germans. Roman Catholicism is the prevailing religion. The capital and chief city is Brünn. Population in 1910, 2,622,272.

Moravian Brethren (also called United Brethren, Herrnhuter and, officially, Unitas Fratrum), a Protestant sect or church, which originally sprang up in Bohemia after the death of John Huss. They built the town of Herrnhut, in Saxony, still the headquarters of the Church. The doctrines of the Brethren had hitherto been more in harmony with the Calvinistic than with the Lutheran form of Protestantism, but under the influence of Count Zinzendorf, who himself became a bishop, they attached themselves to the Lutheran Church. From Herrnhut the Moravian Church extended to other points in Germany, and to England and the United States. The Moravian Brethren have always distinguished themselves as missionaries, and they maintain stations in North and Central America, South Africa, Australia and Tibet. They are noted for the simplicity of their life and manners and for their earnest, if

somewhat narrow and austere, piety. Moravian schools deservedly enjoy a high reputation, even among those who are not members of the community. The Moravian Church is estimated to number about 115,000 adherents. In the United States there are 116 churches, with 16,327 communicants.

Moray Firth or **Mur'ray Firth**, an arm of the North Sea which extends for about 40 miles into the northeastern part of Scotland. It is navigable for steamboats as far as Inverness.

Mor'dants, certain substances which dyers use for the purpose of fixing colors in fabrics. Among the mordants in common use are alum, several of the salts of iron, potassium, bichromate, tannic acid and the "fatty acids" in the form of soap.

More, **HANNAH** (1745-1833), an English writer, born at Stapleton, near Bristol. She was interested in literature from her childhood, but first turned her attention to it seriously after making the acquaintance of Doctor Johnson, Garrick and Burke. Her two tragedies, *Percy* and *The Fatal Falsehood*, were moderately successful, but she soon turned to the writing of moral and religious works, some of which were in her time exceedingly popular. *Coelebs in Search of a Wife* met with immense success, both in England and in the United States.

More, **THOMAS**, **SIR** (1478-1535), an English author and statesman, born in London. He was intended for the priesthood, but he turned to political life instead and entered Parliament in 1504. Through his opposition to the grants of certain moneys to Henry VII, he won the dislike of the king and soon left Parliament, but on Henry VIII's accession, he was given various honors and offices, and in 1517 he became a member of the king's council. This was very much in opposition to his own wishes, as he did not enjoy life at the court. When the Reformation began to be talked of in England, More supported Henry VIII in his defense of the Roman Catholic Church, and when Wolsey fell from power the king made More his successor. Henry found, however, when he wished to divorce Catherine and to break with the Church of Rome in consequence of its refusal to sanction the divorce, that More was by no means a tool in his hands. More resigned all of his offices, and when in 1534 he refused to take an oath which excluded Catherine's daughter from the throne and acknowledged Henry as head of the Church, he was imprisoned. The following

year he was executed after a most unjust trial, and the consternation which reigned throughout Europe at his death shows that he was ranked in his own day, as he is in ours, as one of the noblest characters of history. More's chief literary work is his *Utopia*, written in Latin, which deals with the ideal conditions existing in an imaginary commonwealth located in the Atlantic.

More'a. See PELOPONNESUS.

Morelia, *mo ra'le ah*, or **Valladolid**, a town of Mexico, capital of the State of Michoacan, situated in a valley about 6300 feet above sea level. It is about 125 miles west-northwest of the city of Mexico. It has a mild and equable climate, is well built, has a cathedral, several fine churches and beautiful promenades. Cotton goods and tobacco are manufactured. Population in 1910, 39,116.

Morgan, **DANIEL** (1736-1802), an American soldier, born in Hunterdon County, N. J. He removed to Virginia in 1753, accompanied Braddock's expedition two years later and distinguished himself on the frontier. On the outbreak of the Revolution he went at the head of a company of Virginia soldiers to Boston in July, 1775. In the same year he accompanied Arnold's expedition to Quebec and took command of the force after Arnold was wounded. Though fighting his way into the very heart of the city, he was finally captured was later exchanged and became a colonel of a Virginia regiment, 1777, taking a prominent part in the Saratoga campaign. He later joined Washington in New Jersey, resigned because of his disgust at the management of the war, but fought under Gates in the Southern campaign. In command of the American forces at the Battle of the Cowpens, he won a memorable victory over Colonel Tarleton's cavalry. He was made a major general in the army during the Whisky Insurrection and represented Virginia in Congress in 1796.

Morgan, **HENRY**, **SIR** (1635-1688), a famous English buccaneer, born in Wales. He was kidnapped and sold into slavery in Barbados, when a child, and later he worked his way to Jamaica, where he participated in several buccaneering expeditions. In 1663 he was master of his own ship and soon acquired fame by his daring attacks upon West Indian and Central American towns. His most famous exploit was the sack of Maracaibo, where, after capturing the town, he led his men in the most terrible excesses.

Morgan

Morgan, JOHN HUNT (1825-1864), an American soldier, born at Huntsville, Ala. He was taken in early childhood to Lexington, Ky., where he received an elementary education. In the Mexican War he was first lieutenant, but saw little active service. In 1861 he abandoned his business to join the Confederate service and was placed in command of a cavalry force, with which he did important service in Kentucky and Tennessee. His famous "Christmas Raid" into Kentucky in 1862 won for him promotion and a vote of thanks from the Confederate congress. In June, 1863, he set out to draw Rosecrans from his expedition into Tennessee. Morgan went farther than his orders, crossed the Ohio River and raided Indiana and Ohio towns. A rise in the river, however, prevented his return, and after losing 700 men he attempted to escape into Pennsylvania to join General Lee, but he was finally captured and imprisoned in the Ohio penitentiary. In November, however, he escaped, and later, in command of an independent force, he operated with the greatest success in Kentucky and Tennessee, but on September 4 he was betrayed and was shot while attempting to escape.

Morgan, JOHN PIERPONT (1837-1913), an American financier, born at Hartford, Conn., and educated at a high school in Boston and at the University of Göttingen, Germany. In 1857 he secured employment in a New York banking house, and in 1860 he became the American agent of George Peabody & Co., London brokers. Ten years later he became a partner of the Drexels, under the firm name of Drexel, Morgan & Co., which became the most important private banking house in America. In 1895 he was the leader of the syndicate which purchased \$50,000,000 of the United States 4 per cent bonds; he was the leading spirit in the consolidation of railways, and he held a controlling interest in lines aggregating 50,000 miles in extent, besides owning ocean transportation lines and other large corporate interests. He liberally patronized art and contributed largely to charities. Perhaps his greatest achievement was the formation of the United States Steel Corporation.

Morgan, JOHN TYLER (1824-1907), an American politician and lawyer, born at Athens, Tenn. When nine years of age he moved to Alabama, where, after an academic education, he was admitted to the bar in 1845. He served in the Confederate army, being promoted through all grades to brigadier general, and after the war

Morley

he resumed his practice at Selma. He was elected to the United States Senate in 1877 and



JOHN PIERPONT MORGAN

served continuously for thirty years. He served as one of the arbiters in the Bering Sea dispute of 1892 and was a member of the commission which organized the government in Hawaii in 1898.

Morgantown, W. VA., the county-seat of Monongalia co., 103 mi. s. of Pittsburg, Pa., on the Monongahela River and the Baltimore & Ohio Railroad. The city has a large tin plate factory, a number of glass factories and other minor industries. Rich oil fields and extensive coal measures are near-by, and their development makes the city an important commercial center. Population in 1910, 9150.

Morley, HENRY (1822-1894), an English writer. He was educated at King's College, practiced medicine in Shropshire, taught school in Liverpool and in 1851 went to London as a journalist. From 1857 to 1865 he was English lecturer at King's College, and later he was professor of English language and literature at University College, London, and at Queen's College. In 1882 he became principal of University Hall. His more important works include *A First Sketch of English Literature* and *English Writers*, and *English Literature in the*

Reign of Queen Victoria. He edited various series of literary works, besides writing many literary biographies.

Morley, JOHN (1838-), Lord Morley of Blackburn, an English author and statesman, born at Blackburn, Lancashire, and educated at Lincoln College, Oxford. He studied law and was called to the bar, but soon turned his attention to literature. For some time he was editor of the *Literary Gazette*, and he afterward conducted the *Fortnightly Review*, the *Pall-Mall Gazette* and *Macmillan's Magazine*. He was elected to Parliament in 1883 and some years later was made secretary of state for Ireland. In 1905 he became secretary of state for India in the Liberal ministry. In 1910 he became lord president of the council, but resigned in 1914 because he was opposed to Great Britain's participation in the War of the Nations. Morley's first work in book form was a life of *Edmund Burke*; among his other works are *Richard Cobden*; *Voltaire*; *Rousseau*; *Diderot and the Encyclopedists*; *Oliver Cromwell*; and a *Life of Gladstone*, recognized as the authoritative biography of that statesman.

Mormons or Church of Jesus Christ of Latter Day Saints, a religious organization founded by Joseph Smith, of Sharon, Vt., in 1827. Seven years previously, when he was only fifteen years old, the first two persons of the Trinity had, he claimed, visited him. The visit was repeated in 1823 and again in 1827, on which occasion there was delivered into his hands the golden plates of "The Book of Mormon." The plates were nearly eight inches long by seven inches wide, a little thinner than ordinary tin and bound together by three golden rings. The entire volume was about six inches thick, a part being sealed, and only that part which was unsealed was revealed to him, the other part being reserved for some future time. The letters, characters or whatever they might be called, were of very small size and beautifully engraved. They were in a language unknown to moderns, but called by Smith the "Reformed Egyptian." Accompanying the plates were the Urim and Thummim of Scripture, by means of which Smith claimed to have translated the records thus miraculously discovered. Oliver Cowdery, a youthful associate of Smith's, took down the words as Smith read them to him from the plates, and the first edition of the *Book of Mormon* was issued at Palmyra, N. Y., in 1830. Oliver Cowdery, David Whitmer and Martin Harris united in an affidavit, which prefaced

the work, that they had been shown, by an angel who came down from heaven, the plates from which the book had been translated, and this testimony was supplemented by that of eight other witnesses, including the father and two brothers of Joseph Smith, all of whom claimed to have seen the original plates. No one else was permitted to see them before they were returned to the angel from whom Smith received them. A farmer named Harris having supplied the necessary funds, the book was published, and the new sect of Mormons sprang into active existence and was the means of making multitudes of zealous converts.

The new sect met persecution from the start. Smith organized a church in Fayette, Seneca co., N. Y., April 6, 1830, and then, guided by a revelation, removed to Kirtland, Ohio, in 1831, where a bank was started, with Smith as president. In the same year a colony was founded in Missouri. In 1835 twelve apostles, including Young, were chosen, and soon after, a council of seventy. In 1838 the Kirtland bank failed, and Smith, accompanied by Rigdon, one of the leaders of the church, fled to a settlement of the sect that had been started at Independence, Mo. Here serious trouble broke out, and the denomination, to the number of 15,000, removed to the east bank of the Mississippi River, in Hancock co., Ill., and established a new city, which they called Nauvoo. For the first five years the city prospered. Then the editor of the local paper published an article in which he threatened to denounce Smith and expose his immoral practices. The printing establishment was declared a nuisance by the Mormon authorities and was destroyed. This resulted in an outbreak that was quelled only by calling out the state troops. Joseph and Hyrum Smith were arrested and lodged in jail in Carthage, where they were shot by a mob, June 27, 1844.

Brigham Young succeeded Smith and under his leadership the Mormons emigrated to the valley of Salt Lake, Utah. Here they suffered many privations during a heroic struggle to form a new community. By irrigation they soon transformed the desert region into a fertile valley, where they have continued to increase in numbers and influence. Most of the difficulties with outside organizations, including the United States government, have arisen from the practice of polygamy. The followers of the original organization claim that the practice was introduced by Joseph Smith in accordance with a divine revelation. The members of the Reorganized Church

Morning-Glory

of the Latter Day Saints, however, claim that the practice was introduced by Brigham Young after the Mormons reached Utah. The Lamoni edition of the *Book of Mormon* contains a strong denunciation of polygamy, and the reorganized branch of the Church has always opposed the practice.

Brigham Young was governor of Utah from 1851 to 1858. In 1882 Congress passed a law, since materially amended, requiring that polygamy be abolished, and in 1890 President Woodruff of the Mormon Church issued a decree forbidding polygamous marriages. The Mormon Church claims over 300,000 members in the United States. The Reorganized Church of the Latter Day Saints is an independent church. See LATTER DAY SAINTS.

Morn'ing-Glory, the common name of a number of plants of the convolvulus family, all having handsome purple, white, pink or pale blue funnel-shaped flowers, which open for a short time in the morning and close during the day. The morning-glory was long a favorite plant in country gardens, and in some regions it has run wild and become a weed. See BINDWEED.

Morocco or **Marocco**, a sultanate occupying the northwest extremity of Africa, bounded by the Atlantic Ocean, the Mediterranean, Algeria and the desert. Its area is about 300,000 sq. mi. Its most remarkable natural feature is the Atlas Mountains, the great chain or series of chains extending through it from northeast to southwest, reaching a height of 12,000 to 13,000 feet. Between the mountains and the sea are tablelands and plains, some of them of great fertility. The climate in many parts is pleasant and temperate; in others the summer heat is intense. All parts of the country, however, are healthful. The minerals include copper, iron and antimony, and probably gold and silver. The flora includes the cork oak, the cedar, the Aleppo pine, the date palm and the dwarf palm. Agriculture is in the lowest possible condition, and the annual production is barely enough to supply the wants of the country. The cereal crops include wheat, barley and maize; but millet constitutes the chief support of the population. All the fruits of the south of Europe are cultivated to some extent. Among the wild animals are the panther, the jackal, the hyena, the wild boar, the gazelle and several species of large antelope. Cattle and sheep are reared, and the spirited small horses for which the country was once famous are still numerous. There are large numbers of goats, which furnish

Morocco

a principal article of export—the well-known Morocco leather. In general, among the rural population, each family supplies all its own wants. In the towns, however, some manufactures have sprung up. Fez makes the cloth caps which bear its name—many of which, however, are imported from Austria; and carpets, embroidered stuffs, pottery and arms are also made. The trade is carried on by caravan with the interior or by sea with European states.

The Berbers are the oldest inhabitants and are still the most numerous. The Arabs form the bulk of the rural population in the plains; some of them cultivate the soil, and others are Bedouins. In the towns along the coast are found the Moors, and a considerable number of Jews inhabit all the commercial towns. The civilization of Morocco has sunk to a low condition. The sovereign, or sultan, is absolute in the strictest sense. The imperial revenues are derived from arbitrary imposts on property, duties on imports and exports, monopolies and fines and confiscations. The chief towns are Morocco, Fez, Mekinez and Tangier.

Morocco in ancient times formed part of Mauretania, and about 43 A. D. it was incorporated in the Roman Empire. In the latter part of the seventh century the Arabs spread over North Africa and took possession of the territory. When the Moors were driven out of Spain, after the fall of Granada in 1492, many of them settled in Morocco. In 1814 the slavery of Christians was abolished, and piracy was prohibited in 1817. The conquest of Algeria brought about complications with France, and the plundering of vessels by pirates has often caused trouble with European powers. In 1859 a war broke out with Spain, owing to attacks made by some of the wild tribes upon Spanish territory, and it resulted in a cession of land and the payment of an indemnity of \$20,000,000 to Spain. By a treaty signed in March, 1912, Morocco became a French protectorate. The population of Morocco is estimated at about 5,000,000.

Morocco, one of the capitals of the sultanate of Morocco, situated in the southwest part of the country, on an extensive and fertile plain about 1500 feet above sea level. It is nearly 6 miles in circumference and is walled, though its walls and towers are in a dilapidated condition. The streets are unpaved, dirty, narrow and irregular, and the houses are small and mean. There are several open areas, used as market places, a covered bazaar and many

mosques. Near the palace, which is in the south part of the city, is the Jews' quarter, a walled enclosure about $1\frac{1}{2}$ miles in circumference. There are several tanning and leather-dyeing establishments, but the manufacture of Morocco leather is not as important as it was formerly. During the Middle Ages the city was one of the chief centers of Mohammedan rule and was famous as a seat of learning, but its former splendor is destroyed. Population, estimated at about 50,000.

Morocco, a fine kind of leather, made from the skins of goats, imported from the Levant, Barbary, Spain, Belgium and other countries. It is tanned with sumach, dyed and grained, the last process being that which gives it its well-known appearance. Morocco is extensively used in binding books, upholstering furniture and making ladies' shoes. Imitation moroccos are made from sheepskins. They are so perfect in appearance that it is difficult to distinguish them; but they are entirely lacking in the durability of the real article. The art of preparing morocco is said to have been derived from the Moors; hence the name. See **LEATHER**.

Morpheus, *mor'fuse*, in classical mythology, the god of sleep, twin brother of Mors, death.

Morphine, *mor'fin* or *mor'feen*, or **Morphia**, the bitter narcotic principle of opium, first separated from it in 1816. Morphine forms, when crystallized from alcohol, brilliant colorless prisms. As it is very slightly soluble in water, it is never used alone medicinally, but it readily combines with acids, forming salts extensively used in medicine. In small doses it relieves pain; in large doses it causes death, with narcotic symptoms. It is very commonly administered medicinally by hypodermic injection. The habitual use of the drug is exceedingly injurious, and the "morphine fiend" becomes a perfect slave to his appetite. Those addicted to the use take large doses, many times larger than that which would kill any one who was not inured to the drug. They lose color and flesh, become weak and suffer terrible pains; their memories fail, they lose their moral sense, especially their regard for truth, and become helpless incurables.

Morphology, *mor'fol' o'jy*, the science of form; a branch of zoölogy and botany which deals with the forms of animals and plants and with the forms of their different organs. It is by the study of morphology that the material is obtained for all true systems of classification and arrangement.

Morrill, JUSTIN SMITH (1810-1898), an American political leader, born at Strafford, Vt. He was educated in the common schools and engaged in business, but soon entered politics and in 1854 was elected to the national House of Representatives. He was reelected five times and in 1867 entered the United States Senate, where he remained until his death. His combined service was the longest Congressional career in American history. He was always a leader and served on the most important committees. In 1857 he introduced a bill granting public lands for the founding of state colleges to teach agriculture, mechanic arts and allied subjects. It was first vetoed, but was again passed in 1861 and was signed by President Lincoln. An additional grant was made by an act introduced by Senator Morrill in 1890 (See **AGRICULTURAL COLLEGE**). He is perhaps chiefly remembered, however, as the author of the Tariff Act of 1861, which was the beginning of the present system of high tariff. He was a conspicuous opponent of territorial expansion and of the increase of paper currency.

Morris, CLARA (1849-), an American actress, born in Toronto, Canada. Her stage career began as a member of a ballet and later as leading actress at the Academy, in Cleveland, Ohio. Her success in *Camille*, *Miss Multon* and other plays brought her before the public as one of the foremost actresses of the day. In 1874 she married F. C. Harriott. After 1885 she acted little and spent much of her time in writing. Among her works are *Little Jim Crow* and other stories of children, *Life on the Stage*, *Stage Confidences* and a novel, *The Pasteboard Crown*. In 1904 Clara Morris appeared in an all-star cast of *The Two Orphans*.

Morris, GOUVERNEUR (1752-1816), an American statesman and diplomat, born at Morrisania, N. Y. He was educated at King's College (now Columbia) and was admitted to the bar in 1771. Four years later he entered the provincial congress of New York. From 1777 to 1780 he was a member of the Continental Congress, and in 1781 he was appointed assistant superintendent of finance under Robert Morris. As a delegate to the Constitutional Convention in 1787 he acted with the strong government party and was largely responsible for the literary form of the Constitution. He represented the United States as minister to France and to England and from 1800 to 1803 was United States senator for New York.

Morris

Morris, ROBERT (1734-1806), a signer of the Declaration of Independence, born in England. In 1775 he was delegate to the Continental Congress and was a warm supporter of the Revolution. He gave large sums from his private fortune to the government, and he also endorsed many of its notes. As superintendent of finance, in 1781 he organized the Bank of North America, which was of great assistance to the government in the next few years. In 1787 he was a member of the convention that framed the United States Constitution, and afterwards he was a member of the United States Senate.

Morris, WILLIAM (1834-1896), English poet, artist, printer and social reformer, born at Elm House, Walthamstow, England. He was educated at Exeter College, Oxford, where he formed a lasting friendship with Edward Burne-Jones. Morris' earliest poem of importance, *The Defence of Guenevere*, published in 1858, is now recognized as one of the best of modern poems in any language. Other well-known poems are *The Life and Death of Jason*, *The Earthly Paradise* and *Sigurd the Volsung*. Morris was a socialist and took a prominent and active part in the support of socialism. He was the inventor of the Morris chair, and was a designer and craftsman in furniture, tapestry and interior decoration. In 1891 he established the Kelmscott Press, where he printed a series of exquisite books in a conscientious attempt to prove the soundness of his views on typography.

Morrison, WILLIAM RAILS (1824-1909), an American lawyer and politician, born in Monroe County, Ill. He was educated in McKendree College, served in the Mexican War, was admitted to the Illinois bar and was elected to the legislature in 1855. He served in the Civil War from 1861 to 1863 as colonel of an Illinois regiment, was elected to Congress in the latter year, served one term and again from 1873 to 1887. In 1887 he was appointed to the newly-created Interstate Commerce Commission, on which he served ten years.

Morristown, N. J., the county-seat of Morris co., 18 mi. w. of Newark, on the Lackawanna, the Morristown & Erie and other railroads. During the Revolution Washington had his headquarters here for a time in the old Ford mansion, which now belongs to the Washington Society and contains numerous relics. Four miles from the city is the state hospital for the insane, and other features of interest are the Memorial and All Souls' hospitals, the Y. M. C. A. build-

Morse

ing and the public library. The place was settled in 1710 as West Hanover, and in 1740 received its present name. Population in 1910, 12,507.

Morse, SAMUEL FINLEY BREESE (1791-1872), the inventor of the electric telegraph. He was born at Charleston, Mass., and was educated at Yale College, where he devoted his time



SAMUEL F. B. MORSE

to chemistry and natural philosophy. After his graduation from Yale, he went to England to study painting under West. On his return to the United States he continued painting, and in 1826 founded the National Academy of Design, of which he was first president. On a voyage from Europe he worked out a plan for using electro-magnetism in telegraphy. In 1835 he showed the success of his apparatus through a half-mile of wire which he had strung around his room. Two years later he gave a public exhibition of the telegraph, and this is the date generally given for his invention. On his first appeal to Congress for aid in developing the system, he was refused. The next four years he spent in the United States, attempting to influence Congress to grant him the necessary appropriation for an experimental telegraph line. He was finally successful and received \$30,000 for the construction of the desired line from Washington to Baltimore. This was finished in 1844 and was completely successful. Alfred Vail, a partner of Morse, did much by his skill and knowledge

in perfecting the instruments Morse had invented. In the opinion of some, Mr. Vail was the real inventor of the telegraph, but in a controversy between Morse and Vail concerning some patents, Morse's claims were sustained in the final decision. The actual facts are that Vail did not change the plan which Morse perfected, but that he simply improved the mechanical construction of the instruments.

Morse also, in addition to the invention of the telegraph, laid the first submarine telegraph across the bay in New York. He also took the first daguerreotypes ever made in America. He received distinguished honors from all countries and was elected to the membership of numerous scientific and learned societies. In 1857 the representatives of ten countries voted him \$80,000 as a reward for his labor. In 1871 a bronze statue was erected in his honor in Central Park, New York. See TELEGRAPH.

Mortal'ity, LAW OR, the statement of the average number of persons who die in any assigned period of life, out of a given number who enter upon the same period. Tables and statistics upon which the law is founded are called *tables of mortality*. Such a table (for the United States) follows, the number of individuals of each class considered being 1000:

AGE	DEATH RATE	
	OF MALES	OF FEMALES
Under 1 year.....	138.6	112.1
1 to 4.....	13.3	12.2
5 to 14.....	2.9	2.6
15 to 24.....	4.5	4.0
25 to 34.....	6.7	6.0
35 to 44.....	10.4	8.3
45 to 64.....	23.5	19.5
65 to 74.....	61.6	55.1
75 and over.....	147.4	139.2

The average age of Americans at death in 1890 was 31.1 years; in 1900, it was 35.2. The annual death rate per 1000 in 1912 was 13.9.

Mortar, *mor' tur*, a vessel in which substances are pounded to a powder by means of a pestle. Mortars are made of wood, stone, iron, glass or porcelain. Those made of wood and stone were the first mills used for grinding corn. In colonial times, the small wooden mortar was a common household utensil and was used for grinding coffee and the seeds that took the place of spices. Small glass and porcelain mortars are used in chemical laboratories and by druggists in compounding medicines.

Mortgage, *mor' gaje*, in law, the conveyance of an estate, real or personal, by a debtor to his

creditor, as a pledge of security for a debt. The debtor is called the *mortgagor*, the creditor, the *mortgagee*. The conveyance is absolute in form, but it is subject to a proviso, by which it is to become void, or by which the pledge is to be reconveyed, upon repayment to the mortgagee of the principal sum secured, with interest, on a certain fixed day. Upon the non-performance of this condition, the mortgagee gains absolute ownership at law, but the property remains redeemable in equity during a limited period. In order to obtain absolute possession, the mortgagee has to file a bill of foreclosure against the mortgagor, calling upon the latter to redeem his estate forthwith, by payment of the principal money, interest and costs; and if the mortgagor fail to do so within the time specified by the court, he is forever barred from doing so, to satisfy a debt, and the mortgagee becomes owner in equity, as he before was in law. In the event of a sale, any surplus must be paid to the mortgagor. If personal property, or *chattels*, are pledged as security, the mortgage is known as a *chattel mortgage* (See CHATTEL).

Mor'ton, JULIUS STERLING (1832-1902), an American politician, born in Adams, Jefferson County, N. Y. He was taken in infancy to Michigan, studied at the state university and completed his education at Union College in 1854. In the following year he went to Nebraska, where he established the first newspaper in the state, the *Nebraska City News*. He was elected to the territorial legislature and was for a time acting governor. As the Democratic candidate, he was defeated in the election of 1866. In 1881 he was again an unsuccessful candidate for governor; in 1893 he became secretary of agriculture in President Cleveland's cabinet. He was a lover of nature, a great student of forestry and was responsible for the establishment of Arbor Day in Nebraska, a holiday devoted to the planting of trees, which has been adopted by many other states (See ARBOR DAY). He was an active member of the gold, or conservative, faction of the Democratic party, and at the time of his death he was editing a weekly paper called the *Conservative*.

Morton, LEVI PARSONS (1824-), an American financier and politician, born at Shoreham, Vt. He graduated at Shoreham Academy and immediately entered upon a mercantile career, founding the banking houses of L. P. Morton & Co. and Morton, Bliss & Co., of New York, with branches and affiliated

Morton

firms in London. In 1879 he was chosen to Congress from New York, two years later was United States minister to France and in 1889 was elected vice-president of the United States on the Republican ticket with Benjamin Harrison. In 1895 he was elected governor of New York and served one term.

Morton, OLIVER PERRY (1823-1877), an American politician, known as the "war governor" of Indiana. He was born in Wayne County, Ind., was educated at Miami University, studied law and began its practice in 1847. He soon attained eminence in his profession and entered politics as a Democrat, but because of his opposition to the Kansas-Nebraska Bill, he helped to form the Republican party and was its first candidate for governor in Indiana, but was defeated. He was elected lieutenant governor in 1860 and succeeded to the governorship the following year. Throughout the war he was a strong adherent of the Union cause and did his utmost to spread a loyal sentiment throughout his state, though encountering the greatest difficulties. He succeeded in putting down the disloyal associations and was reelected in 1864. Three years later he entered the United States Senate and was reelected in 1873. There he became a recognized leader of his party, served on many important committees and was a close friend and adviser of President Grant. Three years later he was a prominent candidate for the Republican nomination for president and in the same year served on the electoral commission.

Morton, PAUL (1857-1911), an American financier and politician, the son of J. Sterling Morton, born at Detroit, Mich. He entered the service of the Burlington railroad in 1872 and was promoted through various positions to be general freight agent of the system. He also became interested in coal mines and was second vice-president of the Atchison, Topeka & Santa Fé railway from 1898 to 1904. In that year he was appointed secretary of the navy; but he resigned at the end of two years to become chairman of the board of directors of the Equitable Life Assurance Society. Later he became president of the Society.

Morton, WILLIAM JAMES (1845-), a son of William T. G. Morton and a prominent physician and student of nervous diseases. His contributions to medical literature have been largely in the explanation of his discoveries in the region of electro-therapeutics. He was a pioneer in the use of X-rays, and he himself was

Mosaic

the inventor of a method for creating electric currents of a new variety.

Morton, WILLIAM THOMAS GREEN (1819-1868), an American dentist, famous as being the first to use ether as an anesthetic. He was a brilliant man who invented many dental methods, and, after using ether in a number of minor operations and in many experiments on animals, he made its value known to the public. Dr. C. T. Jackson in England laid claim to the same discovery at about the same time, and Morton was never able to establish fully his claim to priority in his discovery of the anesthetic or his right to receive compensation from the government and individuals for its use, although he involved himself in many legal controversies to secure his fancied right.

Mosaic, *mo za' ik*, a branch of the fine arts by which ornamental patterns and elaborate pictures are made up of small pieces of marble, glass or other substances in different colors, set closely together. It originated in the East and was thence brought to the Greeks and Romans, but did not become especially prominent until the Middle Ages. The Romans practiced it in the decoration of their floors, which were commonly in mosaic of white or light gray marble cubes, about an inch square. Fragments of their pavements have been preserved and exhibit a great variety of design and richness of color. For instance, in the Capitoline Museum at Rome is a mosaic of wonderful workmanship, representing four very lifelike doves, drinking from a basin of water. In the Museum of the Lateran are coarser mosaics, which were taken from the Baths of Caracalla. During the early part of the Middle Ages the Christian churches were adorned with most splendid and expensive designs. Saint Paul's at Rome is decorated with portraits of all the popes, in mosaic manufactured at the celebrated studio in the Vatican. The mosaics in Saint Peter's, Rome, and Saint Mark's, Venice, also are especially beautiful and consist of small pieces arranged so accurately that the general effect is that of a painting. Remarkable imitations of the works of the great master painters have been executed in mosaic. Mosaic work has been used in the decoration of tables and other articles of furniture, and in some of the great museums are pieces so marvelously made that the joints cannot be seen.

In what is known as the *Florentine mosaic*, slabs of white or black marble for tables and other articles are inlaid or veneered with hard

stones. Leaves, petals, stems and other parts of flowers may be cut out of stone of the proper color and shading, and set into the groundwork. A beautiful effect is produced by having some parts in relief; for instance, a cherry will be represented by a brilliant red stone raised above the general surface.

Mosby, *moz'by*, JOHN SINGLETON (1833-1916), an American lawyer and soldier, born in Powhatan County, Va. He was educated at the University of Virginia, was admitted to the bar in 1855 and began practice at Bristol. He served in the Confederate army, and as commander of the famous "Mosby's partisan rangers" did much damage to the Union armies and caused anxiety in northern cities. After the war he practiced law in Virginia, became a Republican and was made United States consul at Hong Kong, in 1878. Upon his return, seven years later, he began the practice of law in San Francisco.

Moscow, *mos'ko*, the second capital of the Russian Empire, the chief town and the capital of the government of the same name, situated in a highly cultivated district on the Moskva, 400 miles s. e. of Petrograd. It is the city where the czars are crowned, and with it are connected many of the most sacred traditions of the Russian people. The Kremlin, which faces the center of the city, is the most sacred spot in Russia (See KREMLIN). To the east of the Kremlin is the portion of the city known as the Kitai Gorod (Chinatown), which still forms the commercial center of Moscow. This is separated from the rest of the city by an ancient turreted wall. About the Kremlin and the Kitai Gorod extends the so-called White Town (Byely Gorod), the most elegant portion of the city, and beyond the White City in a broad zone is the section known as the Earthen Town (Zemlyanoi). Outside of all of these quarters are the suburbs, which are larger than all of the rest of the city combined.

Among the chief buildings outside the Kremlin are the Cathedral of Saint Basil, the most striking building of Moscow, built in the sixteenth century; the modern Church of the Savior; the palace which Napoleon occupied while in Moscow, and the townhall. The principal educational establishment is the Imperial University, founded in 1755 by the empress Catharine. It has over four thousand students, a rich museum and a library of 300,000 volumes. Moscow is the first manufacturing city in the Empire, and of late years, its industrial

and commercial activity has greatly increased. The principal manufactures are textile fabrics, woolen, cotton and silk; but hats, hardware, machinery, leather, chemical products and spirits are also produced in large quantities. On account of its position, Moscow is the great center for the internal commerce of the Empire, and it is in fact one of the chief commercial centers of Europe.

The foundation of Moscow dates from the twelfth century, although the site was probably occupied long before. It became the capital of Muscovy and afterward of the whole Russian Empire, but was deprived of this honor in 1703, when Petrograd was founded. The principal event in the history of the city is its occupation by Napoleon in 1812 and the burning of the city for the purpose of dislodging the French from their winter quarters. In 1896, during a festival in honor of the coronation of Nicholas II, the crowd in Moscow was so great and excitement rose so high that over two thousand people were crushed to death. Population of the city in 1910, not including the suburbs, 1,481,240.

Moscow, IDAHO, the county-seat of Latah co., about 80 mi. s. by e. of Spokane, Wash., on the Northern Pacific railroad and the line of the Oregon Railroad and Navigation Company. The University of Idaho and the State Agricultural Colleges are located here. The principal industries of the surrounding region are mining, lumbering, farming, fruit growing and stock raising. There are tile and brick works, a flour mill, lumber yards and a number of grain elevators. Population in 1900, 2484; in 1910, 3670.

Moselle, *mo zel'*, a river which rises in France in the Department of Vosges, flows northwest, then north, finally northeast, and after a winding course empties into the Rhine, at Coblenz. Its total length is about 320 miles, over 200 of which are navigable. The wines of the Moselle basin are famous for their delicate aroma.

Moses, *mo'zes*, leader, prophet and legislator of the Israelites, born in Egypt about 1600 B. C., during the time of the oppression of the Hebrews. His father, Amram, and his mother, Jochebed, both of the race of Levi, were obliged, in obedience to a royal edict, to cast him into the Nile, but placed him in a basket of bulrushes on the river border, where he was found by the daughter of the Egyptian king as she went to bathe. She adopted him as her son,

Mosque

and in all probability she had him educated for the duties of the priesthood. The promises of God that his race would become a great nation occupied much of his thoughts, and at last, according to the Scriptures, God appointed him the chosen deliverer from the bondage in Egypt. Being slow of speech and possessing none of the arts of an orator, God gave him power to prove his mission by miracles and joined to him his elder brother Aaron, a man of little energy but of considerable eloquence. Thus prepared, Moses returned to Egypt at the age of eighty years to undertake the work. At first he had the greatest obstacles to overcome, but after the visitation of ten destructive plagues upon the land, Pharaoh suffered the Hebrews to depart. Moses conveyed them safely through the Red Sea, in which Pharaoh, who pursued them, was drowned with his army. New difficulties arose, however. The distress of the people in the desert, the conflicts with hostile races and the jealousies of the elders often endangered his authority and even his life, despite the miraculous attestations of his mission. During the term of the encampment at Sinai, he received the Ten Commandments and the laws for the regulation of the lives of the Israelites. When they were already near the end of their journey toward Canaan, Moses saw himself compelled, in consequence of new evidences of discontent, to lead them back to the desert for forty years more of toilsome wandering. On account of a murmur which, in the midst of his distresses, he allowed to escape against his God, Moses was not himself permitted to see the Israelites settled in their new country. After appointing Joshua to be the leader of the Hebrews, he ascended a mountain beyond Jordan, from which he surveyed the land of promise, and there he died in his 120th year.

Mosque, *mosk*, a Mohammedan church, or house of prayer, constructed in the Saracenic style of architecture and often noted for the extent and the grandeur and height of the cupolas or domes. A mosque contains neither altars, paintings nor images, but it has a great quantity of lamps of various kinds, arabesques, which form the principal interior ornament, and sentences from the *Koran* written on the walls. The early mosques which remain to us are the Mosque of Damascus, the Al-Aksa Mosque and the Dome of the Rock, commonly called Mosque of Omar. The Al-Aksa resembled a hall or a Christian church. Another important building is the great mosque at Cordova in Spain,

Mosquito

founded in 786. The main hall was the largest known, measuring 534 by 387 feet and 30 feet in height. There were 856 columns in 19 aisles. The most perfect mosque was built by Ibn Tulun, in 876 A. D. This building is nearly square (390 feet by 455), with a central court, around which on three sides are two ranges of arcades, while on the side toward Mecca there are five. The mosque and tomb of Kaid Bey, erected in 1463 outside Cairo, is one of the most graceful specimens of Mohammedan architecture in existence.

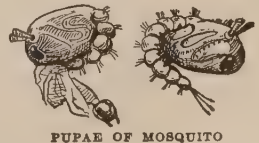
Mosquito, *mos ke'to*, a well-known insect of the gnat family that makes itself a pest by its severe bites. Mosquitoes are constant inhabitants of the warm regions, and during the summer they penetrate even to the arctic regions. In the United States there are about twenty-four species, all belonging to the same family.

The common mosquito may be taken as a type of the entire family. The female pierces the skin and sucks the blood of living animals. The proboscis or beak is needle shaped, slightly enlarged at the end and covered with minute projections, that give it, when magnified, the appearance of a coarse, round file. It is particularly fitted for an instrument of torture and is the principal cause of the irritation that arises from the bites. The proboscis of the male is too weak to pierce the skins of animals, and it feeds on the juices of plants.

The eggs of the mosquito are laid in stagnant fresh water and appear in boat-shaped masses floating on the surface. Each mass is about a quarter of an inch in length and contains from 200 to 400 eggs, set on end in a single layer. In warm weather the eggshatch in about



16 hours, the larvae appearing as *wrigglers*. The larvae live in the water, are very active and feed upon minute aquatic organisms. They change to the pupa stage in about seven days under favorable conditions. The pupae float upon the surface and mature in two or three days, when the imago, or perfect insect, appears. The life-history of the mosquito during the summer is



completed within a period varying from 11 to 14 days, and the insects multiply very rapidly. During cool weather the period of transition is

much longer, and many of the larvae remain torpid through the winter, to become perfect insects the next season.

TRANSMISSION OF DISEASE BY MOSQUITOES. The common mosquito in the United States, and in temperate latitudes generally, does not transmit disease, but in tropical climates its bite is known to cause elephantiasis. Another species, the *Anopheles*, transmits malaria, and a third, the *Stegomyia*, propagates yellow fever.

All diseases communicated by mosquitoes are caused by germs (See **GERM THEORY OF DISEASE**). Elephantiasis is caused by a small, thread-like worm (*Filaria*), which lives in the lymphatic vessels of the skin. Its presence causes the skin to become thickened, rough, warty, livid in color and insensible to feeling. The worms multiply and pass from the lymphatics into the blood of the infected individual, where they are found in abundance at night, when the patient is asleep. During the day, however, they do not exist in the blood. The young worms are sucked with the blood of the infected person into the stomach of the mosquito. They remain in the stomach about 17 days, then penetrate the proboscis. When the infected mosquito bites its next victim the worms escape into the lymphatic vessels of the skin, and there they grow to maturity, multiply and produce elephantiasis.

The malaria mosquito can be easily distinguished from the common species by the spots on its wings. The parasite causing malaria is a minute protozoan, or animalcule, consisting of only one cell and known as *Hoemamoeba*. This parasite infests the red corpuscles of the blood, grows until it occupies the entire corpuscle, then divides into numerous spores, which escape into the liquid plasma of the blood and in turn infest other corpuscles. The spores are liberated from all the corpuscles at the same time, and the liberation produces a paroxysm of chills and fever. There are different varieties of parasites, each having its time for dividing into spores. One variety produces the second brood of spores the second day after the first, so that the malarial paroxysms occur every third day; another produces its second brood in three days and occasions a paroxysm every fourth day, while still another variety causes daily paroxysms. The presence of the malarial parasite in the blood causes the destruction of red corpuscles in large numbers. Standard authorities estimate that a patient of vigorous

constitution during the first four days of daily intermittent fever loses 2,000,000 corpuscles per cubic millimeter of blood, and in certain cases the loss of 1,000,000 corpuscles has been verified at the end of 24 hours. In cases having a duration of 20 or 30 days, the number of red corpuscles may be reduced from 5,000,000, the normal number per cubic millimeter, to 1,000,000, or even less. Quinine kills the spores, so it is an effective remedy. To secure the best results it should be taken when the paroxysm begins.

The *Stegomyia*, or yellow fever mosquito, is found only in the warm regions. It resembles the common mosquito very closely, but it may be distinguished from it by the silver stripes on the thorax and the abdomen. While the nature of the yellow fever germ is not yet understood, experiments in Cuba in 1900, under the direction of Dr. Sternberg, surgeon-general of the United States army, seem to show conclusively that the disease is communicated by mosquitoes. The commission conducting the experiments constructed two rooms for the purpose. One was furnished with beds and bedding which had been used by yellow fever patients. The bedding was not disinfected or even washed. The room was not ventilated, nor open to the sunlight, but it was protected from mosquitoes. Seven non-immune people occupied this room for several days, sleeping in the infected bedding and in some cases wearing the clothing of the yellow fever patients. None of them took the disease. The other room was arranged after the best hygienic plans and was occupied by seven other non-immune persons. Mosquitoes known to have bitten yellow fever patients were placed in this room, and six of the seven people came down with yellow fever. The conclusions of the commission are that yellow fever is not a contagious disease, like smallpox or scarlet fever, but that it is communicated by these mosquitoes and by them only. The results of these investigations point to the necessity of destroying mosquitoes, if the spread of the diseases described is to be prevented.

Mosquito Territory or Mosquito Reserve, a region of Central America, lying on the Caribbean Sea and forming the eastern seaboard of Nicaragua. It has a fertile soil and produces mahogany and other cabinet timber, dyewoods and drugs. It is inhabited chiefly by the Mosquito Indians. For a considerable period it was governed by a native chief and was under British protection, but in 1860 it was made over

Mossbunker

to the State of Nicaragua. The chief town is Bluefields.

Moss'bunker. See **MENHADEN**.

Mosses, small, leafy-stemmed plants of the order of bryophytes. They often form large and very pretty mats of living green in moist and shady woods. Some species grow on trees and stones, and some live on dry soil. They produce no flowers, but they bear spores in cup-like receptacles, that, when ripe, open and discharge their contents. When these spores fall upon the ground, they develop round, slender, thread-like bodies, upon which, in time, little buds appear, and from these buds grow the familiar moss plant, which again produces organs from which spores are formed. Mosses are very hardy plants and have great power of multiplication, young shoots often springing from old ones which have apparently ceased to live. Mosses can grow where nothing else but lichens can exist, and by their vigorous growth the mosses furnish soil for higher plants. Besides this, they help the higher plants by protecting their roots from cold and by filling up swampy places, which in time make good soil. The sphagnum mosses grow in bogs and wet places. While a portion of the stem dies each year, the tip continues to grow higher, and by this process dense beds many feet thick are formed. In time the stems in the lower levels become peat. Some mosses furnish medicines, and others are used as food, while a great many are suitable for bedding and for packing things easily broken.

Moszkowski, *mosh kof'ske*, **MORITZ** (1854-), a Polish pianist and composer. He studied at Dresden and Berlin. When nineteen years old, he made his *début* as a virtuoso and afterward settled at Berlin which he made his headquarters. After 1897 he identified himself with Parisian musical circles. His *Spanish Dances*, among his first pretentious works, are considered remarkably fine, as are others of his later works, such as his symphonies, sonatas and suites. See **MUSIC**.

Moth, the popular name of a numerous and beautiful division of insects resembling butterflies. They are readily distinguished from butterflies by their antennae, which are feather-like or tapering, never terminating in a knob; by their wings being horizontal when resting, and by being seldom seen on the wing, except at night. Butterflies are harmless, but some of the moths, especially in their larval state, are extremely injurious to both vegetable and animal tissue. Other moths, however, are useful, and supply

Motmots

the product silk. See **GYPSY MOTH**.

Mother-of-Pearl or **Na'cre**, the hard, silvery, brilliant, internal layer of several kinds of shells, particularly of the oyster family, often variegated with changing purple and azure colors. It is destitute of coloring matter, but is composed of a series of minute and slightly imbricated layers, or ridges, which have the power of decomposing the rays of light, thus producing beautiful rainbow-like hues. The large oysters of the tropical seas alone secrete this coat of sufficient thickness to render their shells available for the purposes of manufacture. Mother-of-pearl is extensively used in the arts, particularly in inlaid work, and in the manufacture of handles for knives, buttons, toys, snuffboxes and other small articles.

Mothers' Pensions are allowances by law to enable mothers to care for their children. Several states have enacted the necessary laws to put such pensions in force, many more are appointing legislative committees to consider the same. In general, the laws thus far passed provide that any widow, unable properly to support her children under the age of sixteen, shall receive from the state a certain sum of money for that purpose. The principle underlying such legislation is ancient; the particular form in which it now seeks expression is so modern that legislation in regard to it is chaotic and information as to results is meager.

Motion, **LAWS OF**. See **DYNAMICS**.

Motley, **JOHN LOTHROP** (1814-1877), an American historian, born at Dorchester, Mass. His education was received at Harvard University and at Göttingen, in Germany. While in Germany he became intimately acquainted with Bismarck. His first publication, besides contributions to magazines, was a novel called *Morton's Hope*, succeeded by a second novel, *Merry-Mount*, but these were both unsuccessful. From 1861 to 1867 he was ambassador to Vienna, and from 1869 to 1870 he was minister to London. Motley is chiefly noted for his works on the Netherlands, *The Rise of the Dutch Republic*, *The United Netherlands* and *The Life of John Barneveldt*. The years which he spent in Holland in study for his work resulted in most accurate and trustworthy accounts, and his history is a standard for the period of which it treats. (See portrait on next page.)

Mot'mots, a genus of American birds, found from Mexico to Brazil, but preferring the vicinity of streams in dense forests. They live solitary or in pairs. In plumage they may be brown,

Motorcycle

green, cinnamon or black. The head is narrow, the bill crow-like, and the longest of the graduated tail feathers are tipped with a broadened vane.

Motorcycle, a bicycle which is propelled by a motor, gasoline being the usual motive force. As early as 1868 a steam bicycle was invented, and from that time on there has been constant effort to produce a practical machine which could be driven without effort on the part of the rider. The first motorcycles really worthy the name appeared in 1900, and since that date they have grown enormously in popularity. The modern motorcycle is made heavier than a bicycle, that it may stand the strain of the engine and of the speed at which it travels. Racing machines are capable of 50 or 100 miles an hour.

Mott, LUCRETIA COFFIN (1793-1880), an American reformer, born on Nantucket Island, educated in a Friends' School near Poughkeepsie,



JOHN LOTHROP MOTLEY

N. Y., and later chosen a minister in the Society of Friends. She and her husband were ardent supporters of emancipation and were members of the Anti-Slavery Society. Because Mrs. Mott was excluded with other women from the World's Anti-Slavery Convention in London, she and Elizabeth Cady Stanton began to discuss woman's rights and brought the subject before a convention at Seneca Falls, N. Y. Mrs. Mott always worked for universal peace; for temper-

Mound Builders

ance, for anything that would elevate mankind.

Mott, VALENTINE (1785-1865), an American surgeon, born in Glen Cove, Long Island. He studied in London and Edinburgh and in 1811 was professor of surgery in Columbia College; afterward he held positions in the faculties of other colleges. He early gained a world-wide reputation for boldness and originality as surgeon and was considered the most intrepid operator of his time.

Moukden, *mook'den*. See MUKDEN.

Mould. See MOLDS.

Moulmein, *mowl mine'*. See MAULMAIN.

Moultrie, *mole'tri*, WILLIAM (1731-1805), an American soldier, born in South Carolina. Though associated with loyalists, he early espoused the patriot cause in the Revolution, entered the South Carolina provincial congress, took command of a regiment of state militia and defended Charleston against an attack by Sir Henry Clinton, in March, 1776. For his service in repulsing a fierce attack by the British fleet under Parker, he was thanked by Congress, and the fort which he had built on Sullivan Island was named Fort Moultrie. He was also made brigadier general, was given command of the army in the states of Georgia and South Carolina and was active in defending this territory. He was captured at Charleston in 1780, but was exchanged, and was made a major general in the Continental army. He was chosen governor in 1785 and again in 1794.

Mound Bird, one of a group of fowls which have the common habit of building, for a nest, a large pile of vegetable matter, which, by the heat of its decay, hatches the eggs that are distributed through it. The young are quite strong when hatched and make their way out of the pile of refuse and shift for themselves. The birds return to the same nesting place year after year, increasing the size of the mounds, and it is probable that several females use the same heap. The mounds vary in size and character with the species that builds them. The mound birds are principally natives of Australia, though some species are found in New Guinea and other islands. The Australian brush turkey is one of the largest and best known.

Mound Builders, the name given to the people who built the artificial hillocks or mounds which exist in the valleys of the Mississippi, the Ohio, the Missouri and their tributaries. The mounds are of earth or sand, round, oval, square and in some cases polygonal or triangular, varying greatly in height and size. Sometimes they

Moundsville

are erected on the summit of a hill; sometimes they stretch irregularly across the plains. The most important mound still in existence is that of Cahokia, in Illinois. This rises in the midst of about sixty others in four successive terraces, reaching an elevation of ninety-one feet and covering a surface of twelve acres. Some of these mounds appear to have been defensive works, others to have served for ceremonial purposes, and many were certainly burial places. The effigy mounds are the most curious. These are of diverse forms, grouped without any apparent order, representing men, quadrupeds, birds and reptiles. The most celebrated of these effigy mounds is the Serpent, on a hill overlooking Brush Creek, Adams County, Ohio. It now belongs to the Peabody Museum and is enclosed in a public park. The folds of the serpent give a length of 700 feet; in the mouth is an egg, represented by an elliptical mound, the large axis of which measures 160 feet.

The pottery of the Mound Builders was made of clay, dark gray in color, often with a shade of blue in it. Some of their vessels have a capacity of over ten gallons, others of several quarts. Some of the pottery is painted, usually black or very dark gray, but sometimes red, yellow, white or brown. The ornamental parts are often distinguished by different colors, and the shading is always tastefully done. Among the articles obtained from the mounds were necked vases; cooking vessels, sometimes provided with a cover and nearly always with handles; lamps, generally of black pottery; tureens or basins; cups, and pipes. At Mound City, Ill., four pipes were found, with human profiles of a singularly characteristic type. One pipe, representing a woman, will stand comparison with the Mexican sculptures, while one was found in Indiana representing on its opposite faces a death's head and the head of a goose.

The weapons discovered in the mounds consist mainly of arrowheads, made of quartzite, jasper, granite and many other kinds of stone, highly polished. Among the ornaments are pearls, shells, perforated teeth of animals, bones small birds, claws of wild beasts, rings and of earrings of copper, sometimes covered with a film of silver.

Some writers claim that the present-day Indians are the descendants of the Mound Builders; others hold that the race which raised the great mounds has disappeared.

Mounds'ville, W. VA., the county-seat of Marshall co., 11 mi. s. of Wheeling, on the Ohio

Mount Clemens

River and on the Baltimore & Ohio railroad. The state penitentiary is located here, and the city has a fine courthouse. It is in an agricultural and coal-mining region and contains glass works, lumber mills, foundries, flour mills and other factories. The place was once called Grave Creek, and the present name was given on account of one of the largest mounds in the United States. This ancient structure is 70 feet in height, 820 feet in circumference at the base and 63 feet in diameter at the summit. Population in 1910, 8918.

Mountain, a mass of earth and rock rising above the surface of the globe higher than a hill. Mountains are usually found in groups, systems, ranges or chains, though isolated mountains, due to volcanic action, are also found. The elevation of great mountain masses is due to movements of the earth's crust, but mountains of considerable mass have also been carved out by erosion. The highest mountain in the world is Mount Everest, one of the Himalayan range, which is 29,002 feet above the level of the sea. There are three important methods of measuring mountains, namely, by the barometer, by observation of the boiling point of water, and by calculation from data procured by accurate surveying instruments, the necessary formulae being supplied by trigonometry. This last is by far the most accurate method. See PLAIN; PLATEAU.

Mountain Ash, a beautiful shrub or small tree, growing throughout North America, along the northern boundary of the United States. It has handsome leaves and large clusters of brilliant red fruit that make it highly ornamental. A closely allied species is the mountain ash, or *rowan tree*, of Europe, which has long been considered an ornamental tree of great value. Neither of these is an ash in the true sense of the word, as both trees belong to the rose family.

Mount Carmel, *kahr'mel*, PA., a borough in Northumberland co., about 45 mi. n. of Harrisburg, on the Lehigh Valley, the Pennsylvania and the Philadelphia & Reading railroads. It is in a mountainous region near anthracite coal mines, and it contains manufactures of lumber, mining implements and supplies, clothing, flour, cigars and other articles. Population in 1910, 17,532.

Mount Clem'ens, MICH., the county-seat of Macomb co., 20 mi. n. e. of Detroit, on the Clinton River, at the head of navigation, and on the Grand Trunk railroad and several electric railways. The city has a beautiful location,

contains noted mineral springs with curative qualities and has become a popular summer and health resort. There are good hotels, large sanitariums and bathing places and a public library. The city has a large beet sugar factory, cooperage works and casket, wagon, implement and other factories. The place was settled in 1802 and was incorporated in 1872. Population in 1910, 7707.

Mount Desert, *de zurt'* or *dez'urt*, the largest of the many islands on the coast of Maine. It is separated from the mainland on the n. w. by a channel about 2 miles wide, and on the n. e., by Frenchman's Bay. The island is 15 miles long and 8 miles wide with an area of about 100 square miles. The surface is mountainous, some heights reaching 1500 feet. There are three harbors, Bar Harbor, Northeast and Southwest, and several villages, the most important of which is Bar Harbor, famous as a summer resort (See BAR HARBOR). The island was settled in 1608 by French Jesuits, and the first permanent settlement was made by the English in 1761, at Somerville.

Mount Vernon, *vu'r'non*, the home and estate of George Washington, in Fairfax County, Va., on the right bank of the Potomac, fifteen miles s. of Washington, D. C. The mansion was built in 1743 by Washington's brother Lawrence, and it was named after Admiral Vernon of the British navy. Washington's tomb is also on this estate, a few hundred yards from the house, near a picturesque ravine. Washington bequeathed the estate to Bushrod Washington, who in turn left it to his nephew, from whom it was purchased in 1858 by the Ladies' Mount Vernon Association, and it is carefully maintained for its historic interest.

Mount Vernon, *ILL.*, the county-seat of Jefferson co., 76 mi. s. e. of Saint Louis, Mo., on the Chicago & Eastern Illinois, the Southern, the Louisville & Nashville and other railroads. The city is in a fertile agricultural region, near extensive deposits of bituminous coal. It has a valuable trade in grain and live stock and contains manufactures of flour, lumber, cars, dressed marble, and machine shop, creamery and other products. The supreme court building is an attractive structure. The place was laid out in 1819 and was incorporated in 1872. Population in 1910, 8007.

Mount Vernon, *IND.*, the county-seat of Posey co., 18 mi. w. of Evansville, on the Ohio River and on the Louisville & Nashville and the Evansville & Terre Haute railroads. The

city is in a fertile region, which also has deposits of coal, and it contains manufactures of flour, herring, lumber, brick and various foundry and machine shop products. It has a fine courthouse and a Carnegie public library. The place was settled in 1812 and was chartered as a city in 1853. Population in 1910, 5563.

Mount Vernon, *N. Y.*, a city in Westchester co., on the Bronx River and an arm of Pelham Bay and on the New York Central and the New York, New Haven & Hartford railroads. Adjoining New York City on the north, thirteen miles from the Grand Central Station, it is chiefly a residence suburb. There is a Carnegie library a good city building, a new post-office, a hospital and many churches and schools. The place was settled in 1852 and became a city in 1892. Population in 1910, 30,919.

Mount Vernon, *OHIO*, the county-seat of Knox co. 25 mi. n. of Newark, on the Baltimore & Ohio and the Cleveland, Akron & Columbus railroads. The city is in an agricultural region, near natural gas wells, and it contains large Corliss engine works, flour and lumber mills, bridge works and furniture and other factories. Population, 1910, 9087.

Mouse, the name of a number of species of little animals, of which the most familiar is the domestic mouse. There are more than one hundred twenty-five species of the genus, which includes also the rats. The *harvest mouse*, the smallest of quadrupeds, constructs a little globular nest of grass, entwined round and supported by the stalks of the corn or wheat. In this he spends his winter asleep. The common *field mouse* is a dusky brown, with a darker strip along the middle of the back, while the tail is of a white color beneath. The *short-tailed field mouse*, or *meadow mouse*, is not a true mouse, but is one of the voles. On the back it is of a reddish-brown color, inclining to gray; the under parts are lighter, or ashy-brown, and the tail and feet are of a dusky-gray color. The dormouse also is of a different family from the true mice. The jumping mice of America are more closely related to the Jerboas than to the true mice. See JERBOA.

Mouth, *THE*, the first enlargement of the alimentary canal. It contains the teeth and tongue and is bounded above, at the front, by the hard palate, or "roof of the mouth," which separates it from the nose, and at the back, by the soft palate. The mouth is connected with the pharynx by the *isthmus of the fauces*, which



WASHINGTON'S HOME AND HIS TOMB AT MOUNT VERNON

has two muscular pillars on each side, between which are situated the *tonsils*. See PALATE.

Moving Pictures, pictures reproduced in rapid succession in such a manner as to create the appearance of motion. The first successful attempt to take photographs of a moving object was at a race track. A series of cameras was placed along the track and a string was stretched across it and fastened to the shutter of the camera. As the horse ran, he broke each string in succession, and twenty or thirty pictures of him were taken within the period of about two seconds. In 1893 Edison perfected a camera in which a long strip of sensitized film moves rapidly while light is alternately admitted and shut off from the lens. After each exposure the film automatically moves forward, the shutter meanwhile covering the lens. The mechanism is so adjusted that a maximum of forty-five exposures a second is possible. The film moves with an average speed of more than one foot per second.

The pictures thus taken are thrown on a screen or curtain by a projecting machine based on the principle of the magic lantern, through which the films are run by the turning of a crank. Such films may be several hundred feet long, but a single picture on them is about an inch square. The first films for commercial purposes were manufactured in 1898, and the first reel involved an expenditure of \$200. Today it is not uncommon to spend \$20,000 or \$25,000 on a single reel of a seven or eight-reel performance. Enough film is made every year to stretch twice around the earth, each foot of film containing sixteen separate pictures. In the United States alone about 2,250,000 feet of film are displayed every day before 15,000,000 people who have paid from five cents to two dollars as admission. Improvements in technical processes are constantly being made, colored pictures have been introduced, and much of the disagreeable flickering of the early films has been eliminated. The capital invested in this industry is increasing so rapidly that the census officials are far behind in their records, but a careful estimate places it fourth or fifth among American industries, with an annual expenditure of \$175,000,000 for production alone. Probably 25,000 new theatres have been erected to display moving pictures and many other theatres have been remodelled for the same purpose. The "studios" at which moving pictures are produced often cover acres of ground, and one of the great film-producing companies even built

a new city, near Los Angeles, Cal., in which all the residents are actors.

Once the actor for the "movies" was scorned and nameless, but today the stars are widely advertised and many of them receive salaries running into the thousands of dollars. One American actress, first noted as an opera singer, received \$30,000 for a six-weeks' contract. Among the actors and actresses who made their reputations in this new field are Mary Pickford, Francis X. Bushman, Anita Stewart, Marc McDermott, G. W. Anderson, Grace Cunard and Maurice Costello. Many stars of the regular stage have appeared before the moving-picture camera, including Sarah Bernhardt, Mme. Nazimova, Mrs. Fiske, Ethel Barrymore, James K. Hackett, Nat Goodwin and Arnold Daly. Dramatists and novelists of first rank, including D'Annunzio, the great Italian poet and novelist, have prepared the *scenarios* or librettos which form the basis of the action. Many famous novels have been dramatized for presentation in moving pictures, including *Quo Vadis*, by Sienkiewicz, *Last Days of Pompeii*, by Bulwer-Lytton, and *Les Misérables*, by Victor Hugo. *The Girl of the Golden West*, *Cabiria*, *The Birth of A Nation* and *The Christian* are also noteworthy spectacles.

EDUCATIONAL AND SCIENTIFIC VALUE. This is a field destined to be greatly expanded. Moving pictures are being used in factories and machine shops, for example, to illustrate the best methods of operating a machine. They are used in schools to show how to plant and harvest different crops, also how wire fences, boots and shoes and other products are made. By means of pictures the child can understand the successive operations in coal, or iron-mining, or the successive stages in the development of a plant. Anything which is changing can be reproduced in moving pictures. Many schools now own their projecting machines and have exhibitions of pictures at regular intervals. In the study of current events moving pictures are of inestimable value; for example, the construction of the Panama Canal and the voyage of Amundsen and his discovery of the South Pole are preserved in pictures.

Mo'zart (German pronunciation, *mo'tsahrt*), JOHANN CHRYSOSTOMUS WOLFGANG AMADEUS (1756-1791), a German composer, born at Salzburg. When six years old, Mozart appeared at the Austrian court with great success; at seven he published several sonatas, and at eight he played the most difficult works of Bach and Handel before the king of England. In 1769

Mozart, who had been made master of the concerts at the court orchestra at Salzburg, commenced a journey to Italy in company with his father. At Milan in 1770 he composed, in his fourteenth year, his first opera, *Mithridates*, which was performed more than twenty times in succession. He wrote most of his best works in Vienna, including his famous operas, *The Marriage of Figaro* and *The Magic Flute*, and his last work, the famous *Requiem*. The amount of work done by Mozart during his short life is almost incredible, and in every kind of composition, whether vocal or instrumental, he excelled.

Mucilage, *mu' si laje*, a solution of the gum of certain plants in water. It is easily made by dissolving gum arabic in hot water and adding a few drops of carbolic acid to keep it from molding. The name is commonly applied to such prepared solutions as are used for paste.

Mucus, a clear, sticky fluid, secreted by mucous membranes, forming a layer of greater or less thickness on their surface. It covers the lining membranes of all the cavities which open externally, such as those of the mouth, nose, lungs and intestinal canal, and it is renewed with more or less rapidity. Besides keeping these membranes in a moist and flexible condition, it also protects them against the action of the air, of the food and of the different glandular fluids that might otherwise inflame them.

Mug'wump, a term sometimes given to a citizen who is nominally affiliated with a certain political party, but who often votes for other candidates. It was applied to the Republicans who voted the Liberal Republican ticket in 1872 but it became especially common in 1884, as applied to those who called themselves "Independent Republicans" and refused to vote for James G. Blaine.

Muhlenberg, *mu'len burg*, FREDERICK AUGUSTUS CONRAD (1750-1801), an American politician. He was the son of Heinrich Muhlenberg, the founder of Lutheranism in America and was born at New Providence (now Trappe) Montgomery County, Pa. He studied in Germany, and upon his return to America he entered the Lutheran ministry, becoming pastor of an influential church in New York City. In 1776 he returned to Pennsylvania and, entering politics, labored earnestly for the patriot cause. He was elected to the Continental Congress, was many times reelected and was chosen speaker of the first House of Representatives. As chairman of the committee of the whole in 1795, he cast the deciding vote that saved the Jay Treaty.

Muhlhausen, *mul'how zen*, a town of Prussia, in the Province of Saxony, 30 mi. n. w. of Erfurt on the Unstrut. The churches of Saint Mary and Saint Blasius and the ancient town hall are important structures. The town is an important industrial center. The leading industries include the manufacture of cotton, cotton yarns, woollens, damask, chemicals and cigars. Population in 1910, 35,000.

Mu'ir, JOHN (1838-1914), an American geologist, naturalist and explorer. He was born at Dunbar, Scotland, and was educated in Scotland and at the University of Wisconsin. He explored parts of the Pacific coast which had previously been little known, discovered the glacier in Alaska which is named for him and visited the Arctic regions with an expedition in search of the De Long party. Becoming interested in the subject of forestry, he spent much time and energy working for the preservation of forests and the establishment of forests and parks. His writings include *The Mountains of California*, *Our National Parks* and many articles on the physiography and natural history of the Pacific coast.

Muir Glacier, one of the largest and best-known glaciers of Alaska, named from its discoverer, John Muir (See **MUIR**, JOHN). It is situated at the head of Glacier Bay, and has a frontage of nearly three miles and an altitude varying from 150 to 210 feet. Its highest point probably extends 1000 feet above the bed of the ocean. The glacier extends up the mountains for more than fifteen miles and covers an area of 350 square miles, but the actual area drained by it is estimated to exceed 800 square miles. The front presents a vertical or overhanging cliff, resembling in structure rugged, waterworn rock. From this cliff icebergs are constantly breaking and falling, the fall being accompanied by a crash and violent disturbance in the sea. See **GLACIERS**.

Mukden, *mook' den*, or **Moukden**, a town of China, capital of Manchuria and of the Province of Liao-tung, about 400 mi. n. e. of Peking. It is surrounded by a wall and has a second wall which includes the government offices, the palace and other important buildings. The tombs of the early rulers of the present Manchu dynasty of China are located at Mukden. During 1904 and 1905 several great battles which placed Japan among the foremost military powers of the world were fought near Mukden (See **RUSO-JAPANESE WAR**). Population, about 150,000.

Mulberry

Mul'berry, a genus of trees belonging to the nettle family, distinguished by large leaves and fruit which in form and structure resembles the blackberry. Of the several sorts, the *common black mulberry* is the best known and has been cultivated in Europe for more than a thousand years, because of its fruit, which is used as dessert and also preserved in the form of a syrup or light jelly. The *white mulberry* is the most interesting, because it furnishes food for silk-



MULBERRY

worms. This tree has been introduced to some extent into the United States, in the hope that the raising of silkworms might become profitable here. The *red mulberry* bears a fruit of a rich, deep-red color and is native of America. The *paper mulberry*, now much cultivated in Europe, a distinct genus, belonged originally to Japan, where its bark is used in the manufacture of paper. The *Russian mulberry* is a small, hardy shrub that grows very rapidly and has been introduced into the western United States as a hedge plant.

Mule, the name applied to any animal produced by a mixture of different species, but specifically denoting the long-eared animal which is a cross between an ass and a mare. The head of the mule is long and thin, its tail is bushy and its mane is short. The mule is employed as a beast of burden in Spain, Portugal, Italy, in the East, in Spanish America and in the United States. For heavy work it is generally preferred to the horse. See ASS; HORSE.

Mullein, *mul'lin*, a large coarse weed, with large fuzzy leaves on a tall stem, which is crowned

Mullock

by a spike of yellow flowers. It is common in waste places and where the soil is poor. The seed scatters very rapidly. The *common, white and moth mulleins* are three species, of which the last is the most common and the most injurious. The plant grows about two feet high and has blue purplish flowers. The roots should be grubbed out in the fall, to prevent spreading.

Mullens, or **Mullins**, PRISCILLA, the heroine of Longfellow's poem *The Courtship of Miles Standish*. With her parents and brother she was one of the colonists who came in the *Mayflower*. Her parents and brother died during the first winter at Plymouth. Soon afterward she married John Alden. Eleven children were born to them, and among their descendants was the poet Longfellow. See ALDEN, JOHN.

Mül'ler, FRIEDRICH MAX (1823-1900), a celebrated German philologist, son of the poet Wilhelm Müller and commonly known as Max Müller. He entered the University of Leipzig, where he studied Sanskrit under Brockhaus and published a translation of the *Hitopadesa*, a collection of Sanskrit fables. In 1846 he went to England and established himself at Oxford, where he became ultimately sub-librarian at the Bodleian library and professor of modern languages, a position which he held until his death, though he practically resigned in 1875. He was a foreign member of the French Institute and received the degree LL.D. from Cambridge and Edinburgh. His numerous writings included an edition of the *Rig-Veda*, a *History of Ancient Sanskrit Literature*, *Science of Language*, *Chips from a German Workshop*, *On the Origin and Growth of Religion*, *Selected Essays*, *The Science of Religion* and *Natural Religion*; and he was the editor of the series of *Sacred Books of the East*, undertaken by the university.

Mul'let, a name common to two groups of fishes, the gray mullets and the red mullets. Of the true mullets, the common *gray mullet*, found around the shores of western Europe, and in particular abundance in the Mediterranean, is the best known. It grows to the length of eighteen to twenty inches and sometimes weighs from twelve to fifteen pounds. It has the habit of rooting in the mud or sand in search of food. Of the American species, the *striped mullet* is found from New York southward and appears in the markets in early autumn. The *red mullet* is caught in large numbers in the Gulf of Mexico.

Mu'lock, DINAH MARIA. See CRAIK, DINAH MARIA MULOCK.

Mum'my, a dead body embalmed and dried after the manner of those taken from Egyptian tombs. An immense number of mummies have been found in Egypt, consisting not only of human bodies, but of various animals, as bulls, apes, ibises, crocodiles and fish. They are yellow in color and light in weight. The processes for the preservation of the body were various. The bodies of the poorer classes were merely dried by salt of natron, a mixture of salt, saltpeter and sodium sulphate, wrapped up in coarse cloths and deposited in the catacombs. The bodies of the rich underwent the most complicated operations and were laboriously adorned with all kinds of ornaments. Embalmers of different ranks and duties extracted the brain through the nostrils and removed the entrails through an incision in the side; the body was then washed and salted, and after a certain period, the process of embalming, properly speaking, began. This consisted, in general, in steeping the body for seventy days in a strong solution of natron. It was then washed and wrapped in linen bandages; each finger and toe was separately enveloped or sometimes sheathed in a gold case, and the nails were often gilded. The bandages were then folded round each of the limbs and, finally, round the whole body, to the number of fifteen to twenty thicknesses. The head was the object of particular attention; it was sometimes enveloped in several folds of fine muslin, the first glued to the skin, the others to the first, and the whole was then coated with a fine plaster. Mummies have been found in Peru and in Mexico, but they are much less carefully preserved. Natural mummies are frequently found preserved by the dryness of the air. See EMBALMING.

Mumps, a disease of the salivary glands, which is accompanied by swelling along the neck, extending from beneath the ear to the chin. It may appear on one side of the face only, on both sides of face or first upon one side and then on the other. The premonitory symptoms are a soreness and stiffness of the jaw, with pain in the ear, which is soon followed by the swelling. Usually no treatment is necessary, except to keep the bowels regular and to protect the face from exposure to the cold. For several days after the swelling has subsided, a cold is liable to produce serious complications, which sometimes terminate in very dangerous brain diseases.

Münchhausen, *münK'how zen*, HIERONYMUS KARL FRIEDRICH, Baron (1720-1797), a German officer who served in several campaigns against

the Turks in the Russian service, 1737-1739. He was a passionate lover of horses and hounds, of which, and of his adventures among the Turks, he told the most extravagant stories; and his imagination finally so completely got the better of his memory that he really believed his most improbable and impossible fictions. *Baron Münchhausen's Narrative*, a small book by Rudolph Erich Raspe, contains the collection of stories told by Münchhausen.

Muncie, *mun'sy*, IND., the county-seat of Delaware co., about 50 mi. n. e. of Indianapolis, on the White River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Lake Erie & Western, the Chicago, Cincinnati & Louisville and other railroads, all of which are connected by a belt line encircling the city. The surrounding region contains deposits of natural gas and coal, and there is a large trade in farm produce and live stock. The city has extensive iron and steel works, glass factories, paper and flour mills, canneries and manufactures of silverware, wagons, engines, clothing and various other articles. It contains a normal school, a fine courthouse, a city hospital, a public library and a good federal building. Population in 1910, 24,005.

Mun'goose. See MONGOOSE.

Munich, *mu'nik*, (German *München*), the capital of Bavaria and of the District of Bavaria, situated on an extensive plateau, about 1700 feet above sea level, chiefly on the left bank of the Isar. The old town has a quaint and irregular character, but the new town, which has sprung up chiefly to the north and west, has a regular and imposing appearance, and altogether Munich is one of the finest towns in Germany. The center of the life of the city is the Max-Joseph-Platz. Here is located the royal palace, which forms a very extensive series of buildings, chiefly in the Italian style, and contains many magnificent apartments and artistic treasures. Connected with it are the court church and the court and national theater, one of the largest theaters in Germany. Munich is famous for its art galleries; especially the Old Pinakothek, or Museum of Painting, and the New Pinakothek, the Glyptothek, or Museum of Sculptures; the Kunstgewerbehaus, or Industrial Art Building, and the Schack Gallery. The great Bavarian National Museum is world-renowned. The royal library has over 1,300,000 volumes and is one of the richest libraries in the world. The university is attended by over four thousand students and has a library of over 400,000 volumes. There is

Municipal Government

an academy of science, an academy of arts and many fine churches, including the cathedral, which dates from the fifteenth century. There are many beautiful monuments in Munich. The so-called English Garden is a fine park of over 500 acres, watered by two arms of the Isar.

The industries of Munich are numerous, and some of them are important. Brewing is the chief industry, and immense quantities of beer are exported. There are manufactures of leather, gloves, jewelry, glass, carriages and musical instruments; and the mathematical, optical and surgical instruments made in Munich are famous throughout the world. The city is the seat of the high courts of legislature and of law and of all the more important offices of the state. Munich first became known under Henry the Lion in the twelfth century. Much of the magnificence of the city is due to the munificence of King Louis I. Population in 1910, 596,467.

Municipal, *mu nis'e pal*, Government, the government of a city, town, village or other minor civil division of a state. It is most often applied in common speech to the administration of the affairs of a city. The government of a municipality is chartered by the state and represents the state at the same time that it conducts the special activities of the city itself. For instance, in the matter of charity, the exercise of the police power, sanitation and the administration of justice, it is almost solely the agent of the state.

Municipal government as now organized in the United States, and, in fact, generally throughout the world, is administered by a mayor and a common council, through executive boards, partly responsible to the mayor, partly to the council and partly exercising independent functions. The mayor is sometimes elected by the people, as usually in the United States, but often by the council. He is the head of the executive department of government and has the appointment of a large number of officials. The council may consist of one or of two houses. In the latter case the lower house is usually chosen directly by the people by districts; the upper house may be chosen by larger districts or for the city at large, or it may be especially appointed by the whole council from its own number. In the hands of the council are most of the legislative functions, though the mayor usually has a veto power over its measures. The judicial officers of the municipality, as said above, are usually merely agents of the state, although

Municipal Ownership

there are local justices for the purpose of trying petty offenders without delay.

COMMISSION SYSTEM, a system of municipal government, is often known as the *Galveston Plan*, because it was introduced into the city of Galveston, Texas, in 1901. In its simplest form the commission system of city government places the entire administration of the city's business in the hands of a few men, usually five, who are elected by the legal voters. The chairman or president of the commission is the mayor, and each commissioner has charge of some branch of the city's business, for the administration of which he is directly responsible to the people. The commission is the source of all authority in city affairs, makes all the ordinances, appoints all the officers, collects taxes and makes appropriations.

The commission system is characterized by the following features:

1. The assignment of the important divisions of the city government to individual members of the commission, each of whom is directly responsible to the people.

2. Adequate compensation to members of the commission, thus enabling them to devote their entire time to the affairs of the city.

3. Selection of all employees above day laborers on examination, oral and written, and given for the purpose of determining fitness.

4. Provision for retention in office of all employees so appointed, during good behavior.

5. Power of initiation and referendum reserved by the people. See REFERENDUM.

6. Power of recall reserved by the people.

In some cities the terms of all commissioners expire the same year, in others, only one retires each year. This system of municipal government is growing in favor throughout the country.

Municipal Ownership, in general, ownership of anything by a municipality. The term is specifically applied to the ownership, by a city, of public utilities, such as waterworks, lighting plants and railways. There is a division of opinion as to the expediency of a city government managing other than the most necessary functions of government, such as the protection of property and the public health. In the United States, while, in 1800, there were 15 private waterworks plants and one public, at the end of the century there were more than 1700 public plants and less than 1500 private. In Great Britain and Ireland the proportion is even greater in favor of public ownership, and in Canada 75 per cent of the cities own their own

water plants. In regard to the other utilities there is more disagreement, only about two per cent of the cities in the United States owning their gas works; four per cent, their sewage disposal plants; not more than a half dozen cities, their street railway systems; about one-sixth of the cities, their electric lighting plants. The other utilities, such as telephones, ferries, subways and public markets, are owned by cities in a few scattered instances. See MUNICIPAL GOVERNMENT.

Munkacsy, *mün kah'che*, MIHALY (1844-1900), a Hungarian genre and historical painter, whose real name was Michael Lieb, born at Munkacs. After hard work and privations he was enabled to study at Gyula, Vienna, Munich and Düsseldorf, and in 1872 he settled in Paris. Among his best-known pictures were *Last Day of a Condemned Man*; *Milton Dictating Paradise Lost*; *Christ before Pilate*, his most famous picture; *The Crucifixion*, and *The Last Moments of Mozart*.

Munroe', KIRK (1856-), an American author of books for boys, born in Wisconsin. He studied civil engineering at Harvard, but followed this profession for a short time only. The experience and information gained in the West in this work, however, furnished material for many of his stories. He soon went into newspaper work in New York City and was the first editor of *Harper's Young People*. After his marriage, he made his home in southern Florida, a district that colored his later writings. They include *The Flamingo Feather*, *At War with Pontiac*, *Dory Mates*, *The Belt of Seven Totems* and *The Outcast Warrior*.

Mun'see (wolf tribe), the most warlike portion of the Delaware Indians, and the natural leaders of the tribe in all their councils. They were prominent in the early history of New York and New Jersey, but are now widely scattered, those in the United States being comparatively civilized and able to care for themselves.

Mun'ster, a town of Prussia, capital of the Province of Westphalia and of a government district of its own name, situated on a wide plain on the Aa, 78 mi. n. n. e. of Cologne. Among its chief buildings are the cathedral and several other churches, the castle, the townhall and the Stadtkeller, which contains the museum of the Society of Arts. It has a university and a library of about 150,000 volumes. The manufactures include woolen, linen and cotton goods, paper and leather. The most mem-

orable events in the history of the town occurred in 1534 and 1535, when it fell into the hands of the fanatical Anabaptists. Population in 1910, 90,254.

Muradabad, *moo rud a bahd'*, or **Morada-bad**, a town of British India, capital of the District of Muradabad in the Northwest Provinces. It is noted for its metal work and is the center of local trade. It has a Protestant church, an American mission and a cantonment. Population in 1911, 81,168.

Mu'ral Circle, an astronomical instrument, consisting of a telescope attached to a vertical brass circle, which turns upon an axis passing through a stone pier. The brass circle revolves exactly in the plane of the meridian and is carefully divided into degrees and minutes. Attached to the stone pier, and at equal distances apart, are six microscopes for the purpose of viewing the graduated circle and determining exactly its position and consequently that of the telescope. The mural circle is regarded as the principal fixed instrument in all the great public observatories. Its chief use is to measure angular distances in the meridian and so to determine the declination of a star, or its distance from the celestial equator. The right ascension of a star being given by the transit instrument, and its declination by this, its exact position is determined. See ASCENSION, RIGHT; DECLINATION.

Murat, *mū rah'*, JOACHIM (1767-1815), a French marshal, for some time king of Naples. He was the son of an innkeeper at Cahors and was serving in a cavalry regiment when he attracted the attention of Napoleon, whose aid-de-camp he became in 1795. His rise was rapid, many honors were shown him, and in 1800 he married Caroline, the youngest sister of Bonaparte. For his aid in the battles of Austerlitz, Jena, Eylau and Friedland, Napoleon made him marshal of the Empire, grand admiral and prince of the imperial house. In 1808 he commanded the French army which occupied Madrid, and he expected to receive the crown of Spain; but Napoleon placed him on the throne of Naples. He took the title of Joachim I Napoleon. He shared the reverses of the Russian campaign in 1812, and in 1813 he again fought for Napoleon, whose cause he deserted, however, after the Battle of Leipzig. He took up arms again in 1815 for Napoleon, but was defeated and forced to leave Italy. After the overthrow of Napoleon he escaped to Corsica, and later he set sail for Naples with a

view to its recovery. He landed at Pinzo, but was immediately captured, tried by a court martial and shot.

Mur'chison, RODERICK IMPEY, Sir (1792-1871), an English geologist, born in Tarradale, Ross. Murchison re-classified the older formations, introducing the Silurian system, and after his survey of Russia, the Permian system, into geological classification. He was an extensive writer on his favorite subject. Among his most important works are *The Silurian System*, *The Geological Structure of the Northern and Central Regions of Russia in Europe* and *Geology of Russia in Europe and the Ural Mountains*.

Murcia, *moor'the ah*, a city of southern Spain, capital of the medieval kingdom and modern province of the same name, situated on the Segura 30 mi. n. n. w. of Cartagena. Among the public buildings, the most important is the cathedral, with a facade which is a combination of Corinthian and Composite architecture and which dates from the latter half of the fourteenth century. The episcopal palace is one of the finest in Spain. There are manufactures of woollens, silk stuffs, hats and gloves, powder, soap and musical instruments. Population in 1910, 124,985.

Murder, the act of unlawfully killing a human being with premeditated malice, the person committing the act being of sound mind and discretion. In the United States the old common law rule, which classed together all murders, however their circumstances differed, and punished all the same, has been changed by statutory enactments of the states, murders being divided into three classes or degrees, according to the degree of moral culpability. Murders of the first degree are those resulting from specific intent or from the commission of felony. The penalty is usually death or life imprisonment.

Murder is distinguished from *manslaughter* by the existence of malice or evil intent. Manslaughter may result from accident, due to neglect or to misdemeanors, or from sudden intent, due to sufficient provocation. The former is called *involuntary manslaughter*, the latter *voluntary manslaughter*. Punishment varies from five years' to twenty-five years' imprisonment.

Murfree, MARY NOAILLES, better known as Charles Egbert Craddock (1850-), an American novelist, born in Tennessee. In childhood she lived in Murfreesboro, and many of her summers were spent in the mountains of

the eastern part of the state. Being lame and unable to play with other children, she early devoted herself to reading and study. Among her numerous southern mountain stories may be mentioned *The Prophet of the Great Smoky Mountains*, *In the Tennessee Mountains*, *The Phantoms of the Foot-Bridge* and *A Spectre of Power*.

Murfreesboro, BATTLE OF, or **Stone River**, BATTLE OF, a battle fought on the Stone River near Murfreesboro, Tenn., Dec. 31, 1862, and Jan. 2, 1863, between a Federal force of about 41,000, under General Rosecrans, and a Confederate force of about 35,000, under General Bragg. Rosecrans was the aggressor, advancing from Nashville against Bragg's position at Murfreesboro. The opposing generals both planned to open battle on the morning of the 31st, and each intended to begin a vigorous assault upon the enemy's right wing. The Confederates were at first successful, the Federal attack being converted into a desperate resistance. After an all-day's fight, however, the Federals retained their position, though with fearful loss of men and guns. On the morning of January 2 the Confederates again opened a vigorous attack upon the Federal position, but did not gain any important advantage and at night withdrew. The net result of the battle was a strategic advantage for the Federals, though it was probably a drawn contest from a tactical point of view.

Muriatic Acid. See HYDROCHLORIC ACID.

Murillo, *moo reel' yo*, BARTOLOMÉ ESTÉBAN (1617-1682), the greatest of Spanish painters, born at Seville. In 1642 he visited Madrid and was aided by Velasquez, then painter to the king, who procured him permission to copy in the Royal Galleries. Murillo returned in 1645 to Seville, where he commenced that great series of works which have now made his name so glorious. He married a wealthy and noble lady in 1648, and from this time on his fame increased and the most distinguished people of Seville became his friends. He succeeded in establishing an academy of the arts at Seville in 1660 and acted as president the first year. In his early career he painted many pictures of humble life with much charm of grace and humor; but his most celebrated pictures are of a later period and treat religious subjects with a mingled idealism and realism and with a richness of coloring which has seldom been attained. His best-known picture is the *Immaculate Conception*, and others are the *Children of the Shell*,

the *Holy Family with Saint Elizabeth* and the *Vision of Saint Anthony*.

Murphysboro, ILL., the county-seat of Jackson co., 86 mi. s. e. of Saint Louis, Mo., on the Big Muddy River and on the Illinois Central, the Mobile & Ohio and other railroads. The city is in a farming region near deposits of coal, and it contains manufactures of flour, beer, lumber, brick and foundry and machine shop products. Population in 1910, 7485.

Murray, DAVID CHRISTIE (1847-1907), an English novelist. He began his literary career as a writer for a Birmingham paper, was connected with London newspapers and acted as special correspondent during the Russo-Turkish War. He then took to fiction and wrote a number of popular novels, among them *Aunt Rachel*, *The Weaker Vessel*, *The Way of the World*, *Joseph's Coat* and *In Direst Peril*.

Murray, LINDLEY (1745-1826), an American grammarian, born at Swatara, Pa., of Quaker parents. At the age of twenty-one he was called to the bar and acquired an extensive practice in New York City. During the Revolutionary War he engaged in mercantile pursuits with such success that he amassed a fortune. On account of failing health, he then went to England and purchased an estate near Holgate, where he passed the remainder of his life engaged in literary pursuits. He is most widely known by his *Grammar of the English Language*, which was extensively used as a text-book in the schools of England and the United States. He was also the author of a spelling book, English exercises and several other works.

Murray Firth. See MORAY FIRTH.

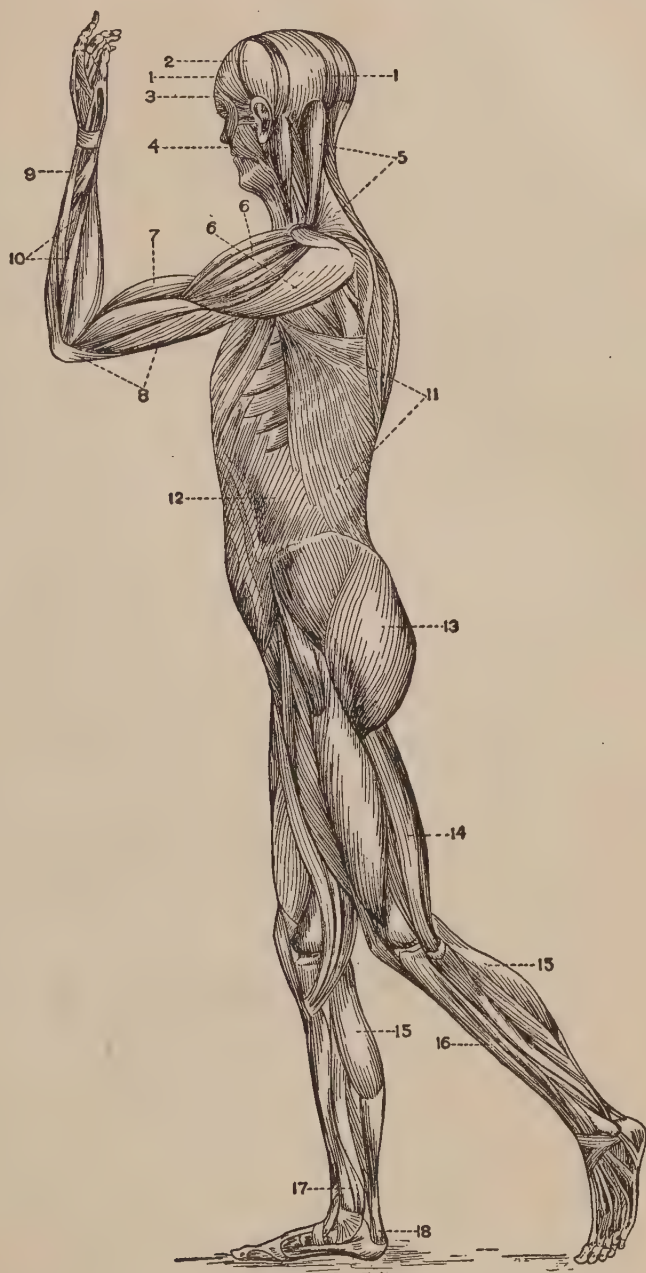
Murray River, the largest river in Australia. It rises in the Australian Alps in Victoria, flows for a long distance westward, forming the boundary between Victoria and New South Wales, then passes into South Australia, where it takes a southern direction and flows into the sea, after passing through a large shallow water known as Lake Alexandrina. There is a sand bar at the mouth which impedes navigation, but small steamers ascend the river for hundreds of miles. Its total length is about 1500 miles, and its chief tributaries are the Murrumbidgee and the Darling.

Murrumbidgee, *mur'rum bi'ee*, a large river of Australia, in New South Wales. It rises in the Australian Alps, flows in a westerly direction and empties into the Murray. Its total length is about 1350 miles, and it is navigable for over 500 miles. Its chief tributary is the Lachlan.

Muscat', **Muskat** or **Maskat**, the chief city of the sultanate of Oman, a seaport on the Indian Ocean, near the east angle of Arabia. The town stands in a hollow, under cliffs 400 or 500 feet high. The streets are extremely narrow, and the town is one of the hottest places in the world. It has an excellent port and is an important center of trade, exporting coffee, pearls, mother-of-pearl, dye stuffs and drugs, and importing rice and sugar. Population, with suburbs, estimated at 30,000.

Muscatine, *mus ka teen'*, Iowa, the county-seat of Muscatine co., on the Mississippi River, about 25 mi. below Davenport, and on the Chicago, Milwaukee & Saint Paul, the Chicago, Rock Island & Pacific and other railroads. The city is located on high bluffs along the river and is an important industrial center, containing flour mills, pickle works, foundries, machine shops, lumber mills, potteries and other factories. There is a considerable trade in lumber, fruit and agricultural and dairy produce. The city has several charitable institutions and the Musser Library. It was settled in 1833 and was incorporated six years later. Population in 1910, 16,178.

Muscle, *mus' l*, or **Mus'cular Tissue**, the flesh, or *lean meat*, of the body, making up about one-half the weight of the body and forming the real organs of movement. It exists under two forms, the *striped*, or *striated*, and the *unstriated*. The latter is made up of elongated, spindle-shaped cells, about $\frac{1}{8}$ of an inch in length, each of which has, near its center, a nucleus. The muscles composed of these fibers are called *involuntary*, because they are not under the control of the will. They receive their nerves from the sympathetic, or ganglionic, system (See NERVOUS SYSTEM). This tissue forms the muscular coats of the digestive canal, of the trachea and bronchi, of the blood vessels and lymphatics, of the ducts of glands and of parts of the eye. It is found in the true skin, where its contraction under the influence of fear or cold causes the roughness known as *goose flesh*. *Striated* muscular tissue exists in bundles of fibers about an inch in length, which are enclosed in an elastic sheath of thin membrane, called the *sarcolemma*; and these bundles, supported and protected by connective tissue, penetrated by nerves from the cerebro-spinal system, freely supplied with blood vessels and bound in a sheath, make up the *voluntary* muscles, those under the control of the will. A few muscles of this class cannot be controlled, as those of the



THE MUSCLES. 1. Muscle of the scalp. 2. Temporal muscle. 3. The muscle that closes the eye. 4. Masseter muscle. 5. Trapezius. 6. Deltoid. 7. Biceps, the flexor muscle of the arm. 8. Triceps, the extensor muscle of the arm. 9. Extensor muscles of the thumb. 10. Extensor muscles of the wrist. 11. Broad muscle of the back. 12. Oblique muscle of the abdomen. 13. Glutaeus. 14. The flexor of the leg. 15. Gastrocnemius. 16. The extensor of the toes. 17. The flexor of the toes. 18. Tendon of Achilles.

Muscle Sense

heart, the internal ear and the pharynx. The name *skeletal muscles* is applied to this class, because so many are attached to bones, among the exceptions being those which surround orifices, as the eye or the mouth. A third kind of muscular tissue is found in the heart. It has striped fibers similar to the voluntary muscles, but neither so long nor so wide; they contain a nucleus and are united by short branches.

The peculiar characteristics of muscles are *contractility*, by which the fibers contract under such stimuli as are furnished by the nerves, by mechanical and chemical agents, by heat and by electricity; *elasticity*, by which the fibers return to their former position after the weight or power which stretched them has been removed; *tonicity*, or the slightly stretched condition in which ordinary muscles exist, even when entirely relaxed. This is shown in the gaping of a wound and in the lapping over of the ends of a broken bone. See TENDON.

Muscle Sense or **Muscular Sense**, the sense which forms the basis of our perception of the direction and operation of movements of the body and also the amount of muscular force necessary to accomplish a given act. The muscle sense lies in certain sensory nerves that are distributed in the muscular tissue and have their centers in the brain. The function of these nerves is to discharge nerve impulses to the motor nerves of the muscle. This sense is capable of being highly educated, and upon its proper training largely depends one's skill in any manual occupation. See MANUAL TRAINING; REFLEX ACTION; SENSES, SPECIAL.

Muses, *mu'zez*, in Greek mythology, the goddesses of music, song and of all arts and sciences. Originally the muses were the nymphs of springs, especially the Pierian springs on the northern slope of Mount Olympus. In Homer they appear as the goddesses of song who sing at the banquets of the gods on Olympus. At first there seem to have been three muses, later increased to nine. They sang to amuse the gods and in honor of great heroes among men. From the earliest times they were associated with the worship of Apollo, under whose direction they were supposed to sing. The early Greeks sometimes regarded the muses as the daughters of Uranus and Gaea, but later writers always speak of them as the children of Zeus and Mnemosyne (memory). Each muse presided over a department of the arts and sciences, as follows: Calliope, over epic poetry; Euterpe, lyric poetry; Melpomene, tragedy; Erato, erotic poetry;

Mushrooms

Thalia, comedy, Polyhymnia or Polymnia, sacred hymns and pantomime; Terpsichore, choral song and dance; Urania, astronomy; Clio, history.

Muse'um, *mu ze'um*, an institution for the exhibition of objects that have an immediate relation to literature, art, science and history. The term means *the home of the muses* and was originally applied to temples sacred to the muses; its present application is of comparatively recent date. Museums are found in nearly all the leading countries of the world. Among those in Europe of special note are the museum of the Vatican at Rome, that of the Louvre in Paris and the British Museum (See BRITISH MUSEUM). The first attempt to establish a museum on a large scale in the United States was in connection with the Smithsonian Institution (See SMITHSONIAN INSTITUTION). The success of this led to the establishment of the National Museum (See NATIONAL MUSEUM OF THE UNITED STATES). There are also museums of art and natural history in nearly all large cities. Among the most noted of these are the museum in Philadelphia, established immediately after the Centennial Exposition; the Museum of Natural History and the Art Museum in Boston, the Metropolitan Museum in New York and the Field Columbian Museum in Chicago.

Mush'rooms, the common name for numerous species of fungi, many of which are edible. Mushrooms are found in all parts of the world, and most species are of a very rapid growth.



TWO VARIETIES OF MUSHROOMS

Certain classes are commonly known as toadstools and puffballs. While many varieties are edible, many are deadly poisonous. In some countries, mushrooms have become staple articles of food, and the natives of Tierra del Fuego and of Australia are said to live almost entirely upon them.

The parts of a typical mushroom are the **cap**, the **gills**, the **ring** and the **stem**. The cap is the expanded top, frequently umbrella-shaped. The gills are the thin plates on the under side

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of the cap, usually extending from the stem to its circumference; they bear the spores by which the mushroom is propagated. The ring is a growth around the stem, just below the gills, and is formed by part of the covering of the cap, left when the mushroom expands into its perfect form. The stem may be wanting altogether, as in the case of puffballs, or it may be short and thick or long and slender. The cap also takes a great variety of forms, some of them fantastic in the extreme. In young plants of some species, the cap, before breaking away from the ring, resembles a button, hence growing mushrooms are often said to be in the "button stage." Mushrooms take a great variety of colors, ranging from pure white to the most brilliant of rainbow tints, and in some species several colors blend, making beautiful specimens when growing, but they soon wither when picked. Certain species are unpleasant or even disgusting in appearance, and all are clammy and cold to the touch. Some species growing on the trunks of trees become hardened with age, and one of these forms, the well-known *touchwood*, or *punk*, has the property of shedding light in the dark.

Edible mushrooms are cultivated for market in the United States and in many of the European countries. They thrive best in a moist atmosphere, from which bright sunlight is excluded. Gardeners usually grow them in beds of soil mixed with decaying horse manure. The beds are long and narrow and are usually covered, to protect them from the sun. The industry is very profitable, when successful. As an article of food, mushrooms contain but little nutrition and are regarded as a delicacy rather than a staple. Of the species commonly found in North America, the *golden peziza*, *clavaria formosa* and *polyporus* are edible; the *russulus* acts as an emetic, and the *fly* mushroom is poisonous.

Since it is difficult for those not thoroughly familiar with the species to distinguish between poisonous and edible mushrooms, these plants should never be eaten unless selected by some one whose knowledge can be relied upon. Any mushroom whose stalks have a swollen base, surrounded by a sac-like or scaly envelope, should be avoided, especially if the gills are white, as should those with a milk white juice.

Music, *mu'zik*, a succession of sounds which please the ear or awaken pleasing emotions; also, the art of producing such sounds and the science which treats of their properties and relations. All sounds are the result of very rapid regular vibrations of some elastic medium,

Music

usually the air, set in motion by a sounding body, transmitted through the intervening space in the form of waves and striking the mechanism of the ear. If the vibrations are fewer than sixteen or more than 8192 in a second the sound ceases to be a musical sound; it is mere noise.

NATURE AND TERMINOLOGY OF MUSIC. Musical tones vary in three respects—*pitch*, *intensity*, or loudness, and *timbre*, or *quality*. The pitch of a tone, or its relative position in a scale of high and low tones, is determined by the number of vibrations of the medium in a given time, a small number of vibrations producing a deep, or *low*, tone, a higher number producing an acute, *high*, or shrill tone. The intensity, or loudness, of a tone is determined by the size of the vibrations, loud tones being produced by wide vibrations in the medium, the soft tones by small vibrations. The quality of a tone depends upon the character of the substance which causes the vibration. For instance, the musical tone caused by the vibrations of a copper string differs in quality from one caused by the vibrations of the vocal cords of the throat. The element of a musical tone which is most commonly under the control of a performer is its pitch. Therefore, this subject will be considered in most detail.

Consider a tone produced by a certain number of vibrations. The tone produced by double this number of vibrations will be in unison with it, though higher in pitch. Between these two notes are several other notes at different intervals of pitch, forming together a series more agreeable than any other. This series is known as the *diatonic scale*. There are eight of these tones, including the first and last. The interval between the first and last tones is therefore called an *octave*, and the intervals between the first and the second, the first and the third, the first and the fourth, etc., respectively, are known as a second, a third, a fourth, etc. Each of the tones of the diatonic scale is given a name, to denote its absolute pitch, that is, its number of vibrations. These are the letters of the alphabet, beginning with A. The scale may be extended up or down, so long as the sounds continue to be musical, that is, so long as the additional tones are in the same relation, as to number of vibrations, as those of the original scale. The tone upon which the scale begins is said to be the *keynote*, or *tonic*, of the scale, and the letter which represents this tone is the name of the key upon which the scale is written. The fundamental key is the key of C. The following table

shows the scale of C through one octave, with the number of vibrations which produce each of these tones, relative to the number which produces C, which is taken as 24 (middle C is in reality 256); also the names by which the tones of any scale, regardless of key, are called, in order:

C	D	E	F	G	A	B	C
24	27	30	32	36	40	45	48
do	re	mi	fa	sol	la	ti	do

It is evident that if a scale is begun with the tone of E, the order of the intervals of the scale will not be in the order of the diatonic scale as given above. On most stringed instruments it is possible to produce the correct order by shortening and lengthening the vibrating string, as required. But on keyed instruments, such as the piano, this is impossible, and to obviate the difficulty a few intermediate tones are represented on the keyboard by black keys, known as the *sharp* and *flat* keys. These are placed at such intervals that a scale may be begun on any tone, and, by the proper insertion of the tones represented by the black key—approximately the proper intervals in order may be produced. However, to do this absolutely, a vast number of keys would have to be inserted, so that in the pianoforte no key is usually absolutely correct. This accounts for the fact that violin music, in which the intervals of a scale can be more closely regulated, is more agreeable to the thorough musician than piano music.

Besides the forms of the diatonic scale, which has an interval of two tones between the keynote and the third and is called the *major* scale, there are so-called *minor* scales, of which the most important kind, known as the *harmonic minor*, has an interval of a tone and a semitone between its tonic and its third and has the seventh note *sharped*, or raised a part of a tone, in the ascending scale. Another form of minor avoids the harsh interval between the sixth and the seventh tones by sharpening the sixth tone. This is known as a *melodic minor*. In both forms the sharps are removed in descending, and the scale is identical with the major, beginning at the sixth tone. The minor which begins upon the sixth tone of a certain major scale is said to be a *relative minor* of that major scale. Thus, the scale of E minor is relative to the major scale of G and the relative minor of the major scale of C is A minor.

NOTATION. Every sound employed in the art of music may be represented by a character, called a *note*, written on a *staff*, that is, five equidistant horizontal lines. A note represents a

higher or a lower sound, according as it is placed higher or lower on this staff. When a note is higher or lower in pitch than any which can be placed upon the staff, short lines, called *ledger lines*, are added above or below the staff, to indicate the relation of the note to those written on the staff. Since the addition of numerous ledger lines is liable to confuse the eye, composers have made use of several staves, of which the most common are the *bass* and the *treble*, the former containing the lower notes. Each line and space of the staff corresponds to a note in the diatonic scale. Each line and space is therefore given a name corresponding to the name of the note for which it stands. The lines and spaces of the treble staff, beginning with the lower line and named in order, are E, F, G, A, B, C, D, E, F. In the writing of music upon the staff, in order to represent scales having any other keynote than C, it is necessary to have symbols to represent the semitones as mentioned above, called *sharps* and *flats*. The sharp (#), placed before a note, raises the pitch by a semitone; a flat (b) lowers it by a semitone. A sharp or flat placed at the beginning of a staff affects every note upon the line on which it is situated. A *natural* (♮) is placed before a note to restore it to its normal or natural pitch, but it acts only through the measure in which it is situated.

In the writing of music, each note upon the staff represents not only the pitch of the tone which it represents, but also the duration of the sound; this is always dependent upon the so-called *time* in which the composition is written. Every piece of music is divided into portions which are to be performed in equal spaces of time. These are called *measures* and are separated from each other, in writing, by vertical lines, called *bars*. The fixed standard of time length of the notes is a whole note (♩). This is divided into half notes, quarter notes, eighth notes, sixteenth notes, etc. Of these a certain number, or their equivalents, are to be used in each measure. At the beginning of every composition is the so-called *time signature*. This does not tell the absolute time to be consumed in the performance of a measure, but indicates, rather, the number of beats or units of rhythm which are to be marked off during its performance, these beats coming at equal intervals of time. The most common signatures are the following: $\frac{4}{4}$, $\frac{3}{4}$, $\frac{2}{4}$, $\frac{3}{8}$, $\frac{6}{8}$, $\frac{8}{8}$, $\frac{2}{2}$. In each of these, the upper number represents the number of beats to the measure, the lower represents the time

value of each beat, that is, the kind of notes which form the units of time in each measure, or the time length of each unit note relative to the standard whole note. The rate of speed is regulated by the performer or composer. Custom has decreed that compositions written with half or whole notes as unit notes be performed in slow, stately time, representative of dignity or reverence, and those written with smaller fractional notes as units be given in faster time, indicative of gaiety or emotion. Besides the notes on the lines and spaces of the staff, other signs are used to indicate the duration of the sounds. A dot placed after a note lengthens it by one half; a curve placed over two notes on the same degree of the staff indicates that they are to be played as one and prolonged to the duration indicated by the two notes together. This is called a *tie*. When an interval of time is to occur between the sounding of two notes, a *rest* is introduced, notes of every time value having corresponding symbols for rests.

Besides the pitch and duration of tones, the quality and intensity may be indicated in a musical composition by certain symbols, usually Italian words, of which the most common are, perhaps, *forte* (loud), *fortissimo* (very loud), *piano* (soft) and *pianissimo* (very soft). A large number of other phrases, indicating the emotion which the music is intended to arouse and the consequent quality of the tones which should represent the music, are used in every composition.

HISTORY. The history of music is naturally divided into two great periods, ancient and modern, distinguished by two facts; the ancients knew nothing of harmony, that is, of the results produced by sounding several notes together; they also knew nothing of a key. The oldest records of music are those of ancient Egypt, dating to about 4000 B. C., but the representations that have been found of the crude cymbals, drums, flutes and harps show conclusively that little progress had been made up to that time. Among the Hebrews and Assyrians the important phase of music was its religious significance, for it never attained among them to the dignity of an art.

In India there are indications that the art of music had made some progress even in early times, but it was left for the Greeks to give the first great impetus to the study. Their music was inseparably linked with poetry. It consisted of a "sort of rhythmic diction," accompanied by coarse instruments, whose chief pur-

pose was to accentuate the rhythm. That part of such a performance which we would call *music*, they distinguished by the name *harmony*. The Greeks also made the first systematic attempt to produce a system of permanent notation. The principal instrument among the Greeks was the lyre, later called the *cythara*. The Romans added little to the knowledge of musical art or science, but to them is due the construction of the first organ and the bagpipe.

The next epoch in the history of music begins with the rise of Christianity, the first great name being that of Gregory the Great, to whom is due the Gregorian chant, still used in the Roman Catholic Church. After the time of Charlemagne, when the Saracens gained a foothold in southern France, their simple, emotional spirit became a lasting influence upon Western music. Somewhat later, in the North, the development of minstrelsy among the Celts and Saxons became an important force, keeping alive the love of music and carrying from place to place the best that was known. Writers of music became more numerous at this time; the monk Hucbald suggested counterpoint (See COUNTERPOINT) and the use of the staff in notation. Adam de la Halle composed a work similar to light opera and developed the idea of harmony, while Guido d'Arezzo practically produced modern notation.

In the sixteenth century another revival took place, and among the names of musical importance of that time are Martin Luther, to whom the Christian Church is indebted for many beautiful chorals, and Palestrina, probably the greatest musical genius in Italian history. Shortly after, the first real opera was produced by Peri, who was followed by Monteverde, who gave to music the touch of imagination and ardor which it needed to bring it to popular esteem. Meantime, the construction of musical instruments was progressing; the violin, organ and clavichord were being perfected, and musicians were appearing to play upon them. From this time, then, all the elements requisite for growth were present—a knowledge of harmony, a musical notation, a diversity of instruments, and enthusiasm.

At this point its history separates into national channels, corresponding to the national spirit which was beginning to pervade literature and politics. The German school was characterized by its scientific accuracy, large themes and powerful use of instruments (See articles under the names of the leading German musicians, as

BACH; HANDEL; MOZART; BEETHOVEN; SCHUBERT; WAGNER); the Italians sought for beauty, purity and striking melody (See articles upon Italian musicians, as ROSSINI; DONIZETTI; BELLINI; VERDI); the French musicians sought to express strong, truthful emotion (See GLUCK; AUER; BERLIOZ; GOUNOD; BIZET; SAINT-SAËNS); the Russian school is notable for its picturesque, melodious and striking themes (See RUBINSTEIN; TSCHAIKOWSKY; PADEREWSKI; MOSZKOWSKI); the Scandinavians have tended to produce music of a stirring, patriotic character, with emphasis rather upon rhythm than upon melody (See GADE; GRIEG); the same may be said of the Bohemian school (See DVORAK; SMETANA). England's musical history, which may be said to have reached its height at the time of Handel, who spent some years in England, has never since attained the same brilliance, and its music is even now rather a composite than an expression of a national spirit and theme (See BALFE; MACFARREN; SULLIVAN; BARNBY; COLERIDGE-TAYLOR). American music has until lately been of little importance, but within recent years a number of composers have appeared who have attained international fame (See CHADWICK; MACDOWELL; DAMROSCH; THOMAS; SEIDL; DE-KOVEN.

See special articles upon the great musical artists, as JOACHIM; MALIBRAN; PATTI; PAGANINI; CHERUBINI; DE RESZKE, EDOUARD; DE RESZKE, JEAN; SOUSA; NORDICA; REMENYI; GUILMANT; SCHUMANN-HEINK; KUBELIK; BULL, and others. Also consult articles on ORCHESTRA; BAND; OPERA; HARMONICS; ORATORIO, and the special articles therein referred to; also articles on the principal musical instruments.

Consult Henderson's *How Music Developed*, Krehbiel's *How to Listen to Music*, Mathews's *A Popular History of Music* and Sarah Tytler's *Musical Composers and Their Works*.

Musical Instruments. See MUSIC, also articles upon the several musical instruments, such as DRUM; CORNET; VIOLIN; PIANOFORTE; ORGAN.

Musk, a substance obtained from several species of deer and used in perfumery and medicine. A perfume of similar character is also obtained from one or two other animals. Musk is very valuable because of its scarcity, and it is therefore much adulterated in the markets, and many substitutes are sold in place of it. See MUSK DEER.

Muskat, *mus kah'*, or **Maskat**, *mahs kah'*. See MUSCAT.

Musk Deer, a genus of deer which is essentially distinct from the true deer. They live chiefly in Asia and the islands of the Eastern Archipelago, though one species is found on the west coast of Africa. These animals attain the size of a young roedeer. The males alone yield the musk. The Tibet musk is most in repute, that known as Russian or Siberian being inferior in quality. Besides its familiar use as a scent, musk is employed medicinally.

Muske'gon, MICH., the county-seat of Muskegon co., 40 mi. n. w. of Grand Rapids, on Muskegon Lake, connected with Lake Michigan by a channel 200 feet wide, and on the Grand Trunk, the Pere Marquette and other railroads. The city has an excellent harbor, conducts a large trade in lumber, fruit, celery and other garden truck and contains lumber, flour, paper and knitting mills and furniture, piano and other factories. The city has a manual training school, a public library, a gymnasium, a hospital and a public square containing a soldiers' monument, all of which are gifts of a prominent business man of the city. Muskegon was settled in 1834 and was chartered as a city in 1869. Population in 1910, 24,062.

Mus'ket, a hand gun with which infantry soldiers were formerly armed. When first introduced, early in the sixteenth century, as a development of the culverin and arquebus, it was discharged by means of a lighted match and was so heavy that in firing it had to be laid across a staff, or *rest*. The wheel lock followed, the chief feature of which was a wheel made to revolve by means of a spring and to cause sparks by friction against a flint. The next improvement was the flintlock proper, in which sparks were produced by one impact of a piece of flint on the steel above the priming powder. Musketeers were soon introduced into all armies, and in the beginning of the seventeenth century infantry consisted of pikemen and musketeers, and all changes in regard to the relative proportion of the two arms were always in favor of the latter. The flintlock musket was introduced into the British army toward the end of the seventeenth century and was the British musket of the days of the Peninsular War and Waterloo, known familiarly as "Brown Bess." It was superseded by the percussion musket in 1842, this musket being in turn superseded by the rifle.

Muskhogeian, *mus ko'ge an*, **Indians** (swamp dwellers), a great family of indian tribes which formerly lived along the Atlantic coast, south of Tennessee, and the remnants of which

Muskingum

now live in Oklahoma. It was an extensive family that varied greatly in different sections of the country. No other indians have proved so intelligent or made such progress in agriculture as have the members of this great family, which was in fact the most advanced of the eastern tribes, even at the time of the discovery of America. The tall and active Creek and the shorter, thickset Choctaw are the two chief types. Their system of government was elaborate and interesting, each tribe living in a village by itself. The western tribes flattened the skulls of their children, and in all tribes they were deformed in some way. See CHICKASAW; CHOCTAW; CREEKS; SEMINOLE.

Muskin'gum, a river in the State of Ohio, formed by the union of the Walhonding and the Tuscarawas. It falls into the Ohio River at Marietta, after a course of about 120 miles, and is connected with Lake Erie by canal.

Musk'melon. See MELON.

Muskogee, *mus ko'je*, OKLA., the county-seat of Muskogee co., is situated 150 mi. n. e. of Oklahoma City, on the Missouri, Kansas & Texas, the Frisco and other railroads. Muskogee occupies a commanding position with respect to the oil, gas, zinc, coal and asphaltum fields of the east end of the state. The surrounding country is fertile. The city has paved streets, comfortable homes, modern office buildings and business blocks, wholesale and manufacturing concerns, handsome churches and a fine high school building. Population in 1900, 4254; in 1910, 25,278.

Musk Ox, an animal related to both the ox and sheep, so named because of its musky odor.



MUSK OX

Resembling in general appearance a large, goat-like sheep, its body is covered with a coat of tufted hair, brownish in color and of great length. The hair about the neck and shoulders is so thick as to give the animal a humped appear-

Mussel

ance; on the rest of the body it is very long smooth and flowing, while interspersed among its fibers is a layer of lighter-colored wool. The musk ox is active and agile and climbs mountainous places with ease and dexterity. The horns, broad at the base, and covering the forehead and crown, curve downward between the eye and the ear and then upward and slightly backward. The ears are short; the head, large and broad; the muzzle, blunted. Gregarious in habits, each herd numbers from twenty to thirty members. The food consists of grass, lichens and herbs. The musk ox inhabits the Arctic regions of America, though formerly it was often found in northern parts of the United States, as well as in northern Europe and Asia. The flesh is pleasant to the taste, though it smells strongly of musk.

Musk'rat, also called *musquash*, a rodent related to the field mouse. It is about the size



MUSKRAT

of a small rabbit and has a tail about 10 inches long. It lives usually in streams and moist places, where it burrows in the bank or builds houses of sticks and rushes. It is of considerable commercial importance, on account of its fur, which in commerce is known as river sable. The muskrat has a strong musky odor, which gives it the name. Different small animals in other countries have been given the same name because of their odor, notably the rat-like *shrew* of India.

Muslin, *muz'lin*, a fine cotton fabric, woven plain, similar to calico, but less compact. It was first made in Mosul, Mesopotamia, whence its name; afterwards it was produced in India, and it was first imported into England about 1670. Thé common muslins to-day are manufactured in France, England and America.

Mus'sel, a term popularly given to several different mollusks. The common mussel is found in the temperate sea waters of Europe and the United States, and in some districts it

is used as an article of food, the best approaching somewhat to the oyster in flavor, though occasionally found to be unwholesome.

Musset, *mü sa'*, ALFRED DE (1810-1857), a French poet, novelist and dramatist. After his graduation from college, he gave himself up wholly to literature, and in 1830 he published a volume of poems which had an immediate and striking success. Besides the volumes of poems, on which his fame chiefly rests, he wrote novels and dramas. De Musset was one of the most distinctive and, in a certain sense, original, of modern French poets.

Mustagh, *moo stahg'*, **Mountains**. See KARAKORUM.

Mustard, the common name of several plants of the mustard family (See MUSTARD FAMILY). The seeds of the white and common mustard, when ground and freed from husks, form the well-known condiment used at the table. The plant is an annual, with stems three to four feet in height, the lower leaves lyrate, the upper narrow and entire. The flowers are small and yellow.

Mustard Family or **Cruciferae**, an extensive order of plants, containing about 1600 known species, consisting of herbs, most of which have flowers with six stamens (two of which are short) and four sepals and petals, which spread so as to resemble a Maltese cross. The fruit is a pod divided into two cells. Many species, such as cabbage, turnip and horse-radish, are cultivated for food or relishes, while others furnish important medicines and beautiful flowers. See MUSTARD; CRESS; TURNIP; CABBAGE; RADISH; HORSE-RADISH.

Mutiny Act, an act passed by the British Parliament each year, granting to the crown the power to regulate the army and the navy. According to the Bill of Rights, the maintenance of a standing army in time of peace is illegal; hence Parliament is compelled to pass a law each year, fixing the strength of the army and determining the cost of its maintenance. But English courts have decided that in spite of Parliament's establishment and maintenance of an army, the king has no power to punish a mutinous soldier in time of peace. Parliament was again compelled to pass a law, annually granting to the Crown this right. In 1879 this, the so-called Mutiny Act, and the other law referred to, known as the Articles of War, were consolidated, and since that time they have been passed each year as one bill, known as the Army Act.

Mutsuhito, *müt sü he'to*, (1852-1912), emperor of Japan. He ascended the throne in 1867 and inaugurated a liberal reform policy, including the adoption of a constitution. During his long reign European influence and ideals be-



MUTSUHITO

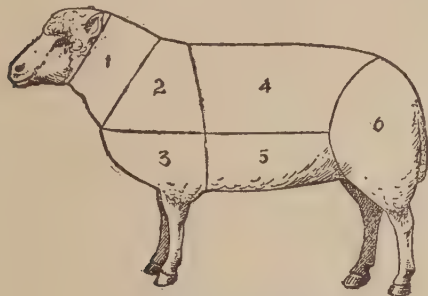
came firmly established in Japan, but it is not known what part the emperor took in the change. The chief events of his reign were the war with China and the war with Russia.

Mutton, the flesh of sheep. Mutton is a nutritious and wholesome meat, having a delicate flavor, and is highly prized as an article of food. Most of the mutton placed on our markets is prepared in the packing houses. After dressing, the carcass is given time to cool and "ripen," when it is ready for market. The carcass is sold to the retail dealer whole, and he usually cuts it according to the diagram. (See illustration on next page.) Large quantities of mutton are exported from Australia and New Zealand to England. The meat is frozen before exporting and is sent in refrigerator ships. See MEAT PACKING; SHEEP.

Mycenae, *mi se'ne*, an ancient city of Greece, in the Peloponnesus, about 6 mi. n. e. of Argos.

It is said to have been founded by Perseus and to have been the residence, before the Trojan War, of Agammenon, in whose reign it was regarded as the leading city of Greece. Its ruins are extremely interesting, especially the Lion Gate and the vaulted building of enormous stones, known as the Treasury of Atreus. Doctor Schliemann carried on excavations here with most valuable results. See SCHLIEMANN, HEINRICH.

Myopia, a deformity of the eye, caused by the lengthening of the diameter of the eyeball from front to back. This is usually produced by



MEAT CUTS FROM A SHEEP

1, neck; 2, chuck; 3, shoulder; 4, loin; 5, flank; 6, leg.

too great a curvature of the cornea, or crystalline lens. Rays of light entering an eye thus deformed are brought to a focus in front of the retina, causing indistinctness of vision. Persons afflicted with myopia are said to be *near-sighted* or *short-sighted*. The defect is remedied by spectacles with concave lenses. See EYE; SPECTACLES.

Myriapoda, a group of animals resembling worms, in that they have long, slender bodies, which, however, are divided into many rings, rarely less than twenty-four, nearly equal in size and each bearing legs. The legs of some species are very numerous and resemble bristles, but in the higher forms they are jointed, like those of insects (See CENTIPEDE). Formerly these animals were classed with the insects, which they resemble very closely in their larval state, but they now are considered a distinct group of the jointed animals (See ARTHROPODA). Myriapods are generally found in dark, moist places, under logs and in cellars. Some are too small to be seen with the naked eye, but others are many inches long. Some species secrete sharp, burning fluids that protect them from their enemies, and others are armed with poison fangs.

Myrmidons, an ancient Greek people of Thessaly, who accompanied Achilles to the

Trojan War. They are said to have emigrated into Thessaly under the leadership of Peleus. The term has come to signify the followers of a daring and unscrupulous leader, or the harsh and unfeeling agents of a tyrannical power.

Myrrh, *mur*, the name given to a gum resin which exudes from a shrub growing in Arabia and Abyssinia. It has been long used as a perfume, for incense and as a medicine. Myrrh of the best quality is known as Turkey myrrh.

Myrtle, *mur'tl*, a genus of plants, consisting of aromatic trees or shrubs, with simple opposite leaves, which are sprinkled with glandular points. The flowers are rose-colored or white. Cloves, allspice and Brazil nuts are produced by members of this family. The common myrtle is a native of the south of Europe and other countries bordering on the Mediterranean. It has been celebrated from remote antiquity on account of its fragrance and the beauty of its evergreen foliage, and by different nations it was consecrated to various religious purposes. The brows of victors in intellectual contests were adorned with myrtle wreaths, and at Athens myrtle was an emblem of civic authority. The running plant known as myrtle in the United States is of a different family and should be called *periwinkle*.

Mysore, *mi sore'*, or **Maisur**, *mi soor'*, a city of India, the capital of the native state of the same name, 245 mi. s. w. of Madras and 10 mi. s. w. of Seringapatam. The town is well built, with regular streets and a number of interesting buildings, among which are the maharaja's palace and the residency. Carpet weaving is the leading industry. Population in 1911, 71,306.

Mysteries, among the ancient Greeks, and afterward, also, among the Romans, secret religious assemblies which no uninitiated person was permitted to approach. They originated at a very early period and seem to have had a double object—first, that of handing down the traditions relating to the divinities in whose honor they were celebrated; and secondly, that of teaching and practicing religious rites. The most important Greek mysteries were: 1, The *Eleusinian*. 2, The *Samothracian*, celebrated in honor of the Cabiri. 3, The *Dionysia*, which were celebrated in honor of Bacchus or Dionysus. These were of so immoral a character that they were latterly forbidden as prejudicial to the public peace and morals. The Roman senate in 166 B. C. also forbade them. 4, The *Orphic*, founded by some who called themselves followers of Orpheus.

Mystery, a kind of rude drama, which was a favorite spectacle in the Middle Ages and which was presented at solemn festivals. The subjects were of a religious character, and the monks were at first the performers and authors, the performance being in church. Such plays were called *mysteries* because they taught the mysterious doctrines of Christianity. They represented scenes from Scripture history, being thus distinct from the *miracle* plays, which dealt with lives of saints, though the distinction is not always observed. The mystery plays were one of the methods employed to give instruction to the people in religious matters and to strengthen the influence of the Church. In later times these plays were usually exhibited in a connected series by the guilds of a town, and it sometimes took several days to perform a series. Thus, we hear of one which lasted eight days and contained the greater part of the Scripture history, beginning with the creation and ending with the judgment day. The *Passion of Christ*, the *Slaughter of the Innocents*, the *Creation of the World* and the *Fall of Man* were among the subjects represented, the first perhaps more frequently than any other. Corpus Christi day was the chief occasion on which they were performed. Mysteries continued to be given from the twelfth to the sixteenth century. Such plays are still given at various places in Roman Catholic countries. The passion play performed at the village of Oberammergau, in Bavaria, every ten years, is a play of this kind. The mysteries were superseded by the moralities. See **MIRACLE PLAY**; **MORALITY**.

Mysticism, *mîs'tî siz'm*, the name given to a condition of mind in which one believes himself to have merged his individuality in that of God; also, to the philosophical and religious theories based upon this conception. Mysticism is of ancient origin, and several important systems of thought and religion have been based upon it. Among these are Buddhism, Brahmanism and several forms of Christian theology. *

Mythology, *mîth ol'o jî*, the collective name given to the body of fables, legends or myths which grow up in almost all primitive nations regarding the creation of the world, the origin of man, the powers of nature and the adventures of the gods and heroes. It is natural that in the savage mind such questions should arise as What is the world? What is man? Who made them? Whence came all the natural objects about us? What causes the changes from light to darkness, from heat to cold, from life to death?

The attempts to answer satisfactorily these questions give rise to a certain body of stories, which are known as *explanatory myths*. Other groups of stories which do not explain, which have no obvious aim beyond that of mere entertainment, which consist in tales of the adventures of gods and heroes, are called *aesthetic myths*.

ORIGIN. Much time has been spent, especially of recent years, in the study of mythologies with a view to discovering their meaning, the way in which they arose and their interrelation. Most attention has been given to the myths of the Greeks and Romans, the Egyptians, the Norsemen and the Hindus. For the great similarity which is found in many of the myths of these different peoples, various explanations have been advanced. One is that all of these peoples had a common ancestry, and that their myths and legends date back to the ages before the separation took place. Another, and on the whole more satisfactory, explanation is that with the same primitive surroundings the same questions are likely to arise and similar explanations are likely to be made. Another question regarding the myths, that as to the method of their origin, has also been answered in various ways. One is that the gods and demigods treated of were originally merely men who were remembered after death for their famous achievements and who came in time to be regarded as more than human. A second theory is that wise men invented those myths in which the gods appear as good and just and beneficent, for the purpose of establishing law among communities through a wholesome reverence for higher powers. This view necessitates the conclusion that the myths in which the gods are represented as capricious, unjust and immoral were later inventions of poets or storytellers. Still another view is that all myths were originally the explanation of physical phenomena, but that many of them have lost their original significance. (For a general account of this subject of the growth and explanation of myths, see Gayley's *Classic Myths in English Literature*).

GRECIAN AND ROMAN MYTHOLOGY. These may well be treated together, since the accounts of the creation are practically identical with the two peoples, and since the Grecian gods, with their attributes and legends, were to a large extent adopted by the Romans. The explanation given in classic mythology of the beginning of all things is that in the beginning there was a vast abyss, known as Chaos. There arose first

Earth (Gaea) and love, and from these came heaven and the mountains, the seas, the fields, the animals and vegetation. Of Chaos were born Erebus and Nox (night), and from these in turn sprang light and day. The Titans, children of Uranus (heaven) and Gaea, were twelve in number, and by one of these Titans, Saturn, Uranus was at length dethroned. Saturn, with Rhea, his sister and wife, reigned for a time supreme, until he in turn was dethroned by Jupiter, his youngest son. Jupiter divided the universe by lot, he himself receiving the earth and the heavens, Neptune the sea, and Pluto, Hades, the lower world. Jupiter was supreme, however, over his two brothers and over all the other great gods, of many of whom he was the father. Juno, his sister and wife, was the queen of heaven. The great gods who dwelt on Olympus were Jupiter, Juno, Minerva, Mars, Vulcan, Apollo, Diana, Venus, Mercury and Vesta. Ceres, who was a sister of Jupiter, usually had her abode on earth. The lesser deities were very numerous, and they were regarded as inhabiting the woods, the sea and the mountains. Another question to be accounted for was the creation of man. The explanation of this was that he had been made out of stones or grew from trees, or that Prometheus, a Titan, molded man out of clay in the image of the gods. During the Golden Age, which was believed to correspond with the rule of Saturn, men lived in perfect innocence, but as greed, hatred and lust grew up among them, their state became so bad that Jupiter was finally obliged to send a flood which wiped from the earth all human beings except Deucalion and Pyrrha, who had always been just servants of the gods. A more detailed knowledge of the myths of Greece and Rome may be gained by reading the articles on the personages mentioned above.

SCANDINAVIAN OR NORTHERN MYTHOLOGY. This is the name given to the body of myths which in its earliest forms was common to all the Teutonic nations, to the Germans and Scandinavians, as well as to the ancestors of the English. The legends tell that in the beginning there was no world, but only a vast abyss, to the north of which was mist and to the south of which was light. Twelve rivers had their sources in the mist world, and these flowed into the great abyss, where they were frozen. The warmth from the light world melted this ice, and from the mist which arose came Ymir, regarded as the father of the giants, and the cow Adhumbra. The giant was nourished by the

cow's milk, and the cow by the salt which she licked from the ice. One day, while she was thus feeding, human hair appeared above the ice; the next day a head came into view, and shortly after the god Bori appeared. From Bori all the gods were descended. Odin and his two brothers, the grandsons of Bori, killed the giant Ymir and of him they formed the earth, making the solid ground from his flesh, the ocean from his blood, the rocks from his bones, the forests from his hair, the clouds from his brains and the canopy of heaven from his great skull. The great gods, known as the *Aesir*, were twelve in number, and the goddesses were twenty-four in number. These immortals lived in a realm known as Asgard, regarded as some place above the earth. The most of the gods were beneficent in their dealings with man, and in northern mythology there are fewer stories showing the gods as cruel and licentious than there are in the classical myths. Lok, the god of evil, was at first considered not so much the personification of evil as of mere mischievousness. As time went on, however, the conception of him changed, and he came to correspond closely with the Satan of the Christian religion. Men, according to the northern mythology, were created from trees. In the beginning they lived in perfect innocence and goodness, but with the advent of Lok on earth and with the entrance of the giants into various relations with men, the age of innocence came to an end, and gods and men were involved in a struggle for existence with the powers of evil. One distinctive point of the northern mythology was the belief that a time known as Ragnarök (the Twilight of the Gods) would come, when the rule of Odin and his fellow gods would come to an end, when the powers of evil would triumph, when Asgard with its palaces would be destroyed. They believed, however, that out of the destruction of the old order of things would arise a new heaven and a new earth and that peace and happiness would once more reign. See BALDER; FREYA; FRIGGA; HEIMDALL; LOK; ODIN; THOR; TYR.

EGYPTIAN MYTHOLOGY differed from that of the Greeks and Romans and the northern people in that it consisted, originally, not in a general or national religion, but in a number of religions which grew up in separate towns and villages. Naturally, as some of the cities increased in importance and gained control of others, the stronger ones were able to force their religions upon the weaker, so that as time went on the

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gods became fewer and attained importance among a larger number of worshipers. There was never, however, in Egypt a complete fusion of the different religions. One of the distinctive beliefs of the Egyptians was that the soul of man was immortal. All the Egyptian religions united in this belief, although

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there was a great difference of opinion as to where and in what state the soul lived after death. See AMMON; APIS; ISIS; RE; OSIRIS; SERAPIS. See also MYTHOLOGY, Volume V.

Consult Guerber's *Myths of Greece and Rome* and *Myths of Northern Lands*; also Bulfinch's *The Age of Fable*.



N, the fourteenth letter of the English alphabet, in its form derived, with practically no change, from the Phœnician alphabet. Its value, also, has been the same from the earliest time. In English and most other languages, *n* has a pure nasal sound, and it is much the commonest of the nasals. In a few words, after *m* and *l*, it is silent, as in *hymn*, *kiln*; and in many words it has, in unaccented syllables, the force of a vowel, as in *open*, *chosen*.

The commonest use of *n* as an abbreviation is for *north*.

Nab'opolas'sar, a Babylonian king, the founder of the New Babylonian Empire. He was not of royal family, but rose to great power in Chaldea, to the south of Babylon, and succeeded in extending his power to Babylon in 626 B. C. Later, about 606 B. C. he took and destroyed Nineveh. He died about 605 B. C.

Nagasaki, *nah'ga'sah'ke*, a city and port in Japan, capital of the prefecture of the same name, on the west coast of the island of Kiushiu, beautifully situated on a peninsula and enclosed by hills, upon the sides of which a portion of the town is built. The harbor is excellent and the trade very large. Nagasaki was one of the five Japanese ports opened in 1858 to the British and Americans, and eleven years later it was opened to foreign nations generally. The chief exports are copper, silk, camphor, tobacco, porcelain, lacquered wares and sugar. Population in 1908, 176,480.

Nago'ya, a city of Japan, situated on the island of Hondo, 170 mi. w. s. w. of Tokyo, and on the Bay of Owari. The city is well built and contains many temples and monasteries, also a castle. Its industries include the manufacture of porcelain, lacquered ware, enameled ware, fans, embroideries, cottons and silks. It is one of the most important cities on the island. Population in 1908, 378,231.

Nagyvarad. See **GROSSWARDEIN**.

Na'hum, one of the twelve minor prophets, the author of a book in the Old Testament.

His prophecies relate to the destruction of Nineveh, which he describes in vivid colors. The period in which he lived is uncertain, but it was probably between 700 and 600 B. C.

Naiads, *na'yadz*, in Greek mythology, nymphs of fountains and brooks, of similar character to the dryads and resembling the nixies of the northern mythology.

Nails, small, slender pieces of metal, generally with round or flattened heads, used for driving into timber or other material for the purpose of holding separate pieces together. There are so many kinds and sizes that a list of them all would fill a considerable space. The kinds in most common use are wrought, cut, wire, horseshoe and shoe nails. *Wrought nails* were formerly made by hammering them from a small bar of iron or steel called a *nail rod*. For centuries this was the only method of nail making known, and thousands of men, women and children in and around Birmingham, England, were engaged in the work. Now all nails are made by machinery.

Many patterns of nail-making machines are now in use, and the process of manufacture has been so cheapened that the price of nails is much less than formerly. *Cut nails* are made by rolling the iron into flat bars, which are a little wider than the nail is long, and of the same thickness. These bars, called *nail plates*, are fed into a machine, which cuts the nail, then seizes it in a vice-like arrangement and strikes it a sharp blow with a die, which forms the head. By an ingenious device, the plate is usually fed into the machine so as to have the wide part of the nail cut from the two edges alternately; in this way waste of iron is prevented.

Wire nails are now in use for most purposes. They are made from steel wire which is prepared especially for the purpose (See **WIRE**). The work is all done by machinery. The wire is wound on a reel; one end of it is fed into a nail machine, which cuts the nail, points it

and makes the head automatically. A single machine will make from one hundred fifty to five hundred nails a minute, depending on the size, the large nails requiring more time than the small ones. Half a million tons of wire are made into nails in the United States each year.

The size of nails is denoted by the term *penny*; as, six-penny and eight-penny. The word penny in this sense means pound, and the term indicates the number of pounds that a thousand nails of that size will weigh; as, one thousand six-penny nails will weigh six pounds. Very large nails are called *spikes*, and very small ones, *brads* or *tacks*, according to the shape.

Nails, of animals, are a form of the outer layer of the skin. In man the nails do not enclose the ends of the fingers and toes, but in the horse and other animals the nails assume the form of protective coverings and are then known as "hoofs." Nails may be produced to form "claws," as in birds and flesh-eating animals, while in the sloths they are large enough to aid in climbing trees. The human nails consist of a root, which is hidden below the skin, and an exposed part, which is attached to the skin. Both are produced from the true skin. They grow in length about one-thirtieth of an inch in a week on the fingers and more slowly on the toes. If a nail be removed by accident, it will grow again, provided the cells which secreted it have not been injured. The light spot at the base of the nail is called the *lunula*.

Namaqualand, *na mah'kwa land*, **GREAT**. See GERMAN SOUTHWEST AFRICA.

Names, PERSONAL. It is probable that at first all names were significant. Old Testament names are almost all original; that is, they were given in the first instance to the individuals bearing them. They either originated in some circumstance of birth or expressed some religious sentiment, thus: Jacob (supplanter), Isaiah (salvation of Jehovah), Hannah (favor), Deborah (bee). When some important change occurred in a man's life, his name was often changed to fit his new circumstances or disposition. Thus Abram became Abraham, and Jacob became Israel. Neither the Hebrews, Egyptians, Assyrians, Babylonians, Persians nor Greeks had surnames; and in the earliest period of their history the same may be said of the Romans. In course of time, however, every Roman citizen had three names, the *praenomen*, or personal name, the *nomen*, or name of the gens or clan, and the

cognomen, or family name, as Publius Cornelius Scipio. Conquerors were occasionally complimented by the addition of a fourth name, or *agnomen*, commemorative of their conquests, as Publius Cornelius Scipio *Africanus*. Greek names often implied some great virtue, some special favoritism on the part of the gods or some future great event; while Roman names referred often to the personal appearance and were frequently supplemented by the occupation, place of birth or a nickname. Times of great public excitement have had a very considerable influence in modifying the fashion in names.

It is impossible to state with any degree of certainty when the modern system of personal nomenclature became general. Surnames were introduced by the Norman adventurers, but were for centuries confined to the upper classes. They became general in Scotland about the twelfth century. In some of the wilder districts of Wales they can hardly be said to have been adopted even yet. The principal sources from which surnames have been derived are personal characteristics (Black, Long, Short); rank, profession or occupation (Bishop, Knight, Miller); localities or natural objects (Hill, Dale, Stone), and patronymics (Johnson, Wilson, Andrews). The Scotch *Mac*, the Irish *O'*, the Norman *Fitz*, the German *-sohn*, the Scandinavian *-sen* and the Russian *-vitch* have the same force as the English *-son*. The Hebrews had no surnames proper, but to distinguish two men of the same name they used the form Solomon ben David (Solomon, son of David). The Welsh use the word *ap* in the same way—Evan ap Richard (John, son of Richard). In most nations the wife changes her surname on marriage to that of her husband; in Spain, however, she retains it, while the son may adopt either the paternal or the maternal name. In many states of the Union a man can change his name only by securing a special act of the legislature of his state.

Namur, *na moor*, a town of Belgium, capital of the province of the same name, situated at the junction of the Sambre and the Meuse, 36 mi. s. e. of Brussels. The most notable buildings are the cathedral, the townhall and the citadel, on the site of one of Caesar's camps. The town carries on manufactures of cutlery and hardware. Namur was one of the most powerful fortresses in Europe, but it was taken by the Germans in 1914 after a siege of only three days. Population in 1910, 31,939.

Nanaimo, *nah ny'mo*, British Columbia, Canada, a town on the east side of Vancouver

Nana Sahib

Island, 35 miles from Vancouver. Lumbering and coal mining are the principal industries of the neighborhood, and the packing of salted herring is an important industry in the town. Population in 1911, 8306.

Nana Sahib, *nah'na sah'hīb*, (about 1820-?), the leader of the Sepoys in the Indian mutiny. He was adopted by the ruler of the Mahratta State of Bithur, but on the death of the latter the British government refused to recognize Nana's claim to the succession. In May, 1857, there arose a mutiny of the Sepoys in Cawnpore, and Nana, after offering to help the English, treacherously placed himself at the head of the mutineers. The Europeans in Cawnpore capitulated on a promise that they should be sent down the Ganges in safety, but the men were all shot down, and the women and children were massacred, on the approach of a British force. Nana was defeated by Sir H. Havelock, and was driven across the frontier into Nepal. There all knowledge of him ceases, but the general opinion is that he escaped into central Asia.

Nancy, *nahN se'*, a town of France, capital of the Department of Meurthe-et-Moselle. It is a well-built town, with broad streets and fine buildings. The ancient citadel, the ducal palace and the Hotel de Ville are among the most noteworthy structures. One of the leading universities of France, comprising schools of medicine, law, science, philosophy and pharmacy, is located at Nancy. The chief manufactures of the town consist of broadcloth and other woolen stuffs, cotton goods, hosiery, lace, boots and shoes, embroidery and musical instruments. The trade is extensive. At Nancy was fought in 1477 the battle between the duke of Lorraine and Charles the Bold of Burgundy, who was defeated and slain (See CHARLES THE BOLD). From 1820 to 1873 the town was occupied by the Germans. Population in 1911, 119,949.

Nan'du. See RHEA.

Nanking, a city of China, capital of the Province of Kiangsu, on the Yang-tse-Kiang, about 580 mi. s. s. e. of Peking. It is 18 miles in circumference and is surrounded by a wall, which is in most places over 40 feet high. A military college, an arsenal and factories for the making of materials of war are the most important features of the town. The city was at one time the capital of the Chinese Empire, but when the seat of government was transferred to Peking, about the end of the fourteenth century, Nanking lost its importance and a great part of its popu-

Nansen

lation. The city was held from 1853 to 1864 by the Tai-pings, who made it their capital. The famous porcelain tower, completed in the fifteenth century, was destroyed during the Tai-ping rebellion. Nanking is still one of the chief literary centers of China. Population, estimated at 270,000.

Nansen, *nahn'sen*, FRIDTJOF (1861-), a Norwegian Arctic explorer. He was educated in the university at Christiania, devoting himself to zoölogical study. Before he was of age he



FRIDTJOF NANSEN

made a notable voyage between Spitzbergen and Greenland to investigate animal life in those regions; and in 1888 he made his memorable expedition across Greenland on the ice cap, on his return from which he received a grand ovation from his countrymen.

But the achievement on which his fame as an explorer must rest was the expedition on which he started in June, 1893, from Christiania, the capital of his native land, to the Arctic regions, with twelve companions, in the *Fram*, a vessel constructed after his own plan, specially adapted to resist the pressure of ice floes. In September of the same year, he thrust his vessel into an ice pack, in which the party drifted, thus imprisoned, for eighteen months, until March, 1895. Nansen now, with one companion, left the ship and made his way by sledges toward the Pole. After the

endurance of fearful hardship, he reached latitude $86^{\circ} 4'$, but was then obliged to turn back to an island of the Franz Josef Land Archipelago, where he passed the winter in a stone hut. A start for Spitzbergen was made May 19, 1896, and when off Cape Flora he and his companions were fortunate enough to encounter Captain Jackson, of the British exploring expedition, who provided them with food and clothing. After an absence of three years, Nansen reached his home on Jackson's ship, and about simultaneously his vessel, the *Fram*, reached the Norwegian coast.

The most important discovery made by Doctor Nansen was the development of the fact that there is no Arctic continent, as had been invariably assumed by previous Arctic explorers, but only an immense ocean of great depth. During his three years' exile from civilization he passed over hundreds of miles of hitherto unexplored coast, discovered a number of new islands and traversed 50,000 square miles of unknown waters. The highest point reached by him in the Arctic regions was 195 miles nearer the North Pole than any man had ever before been, and 261 miles, by his calculation, from the Pole itself. Nansen wrote a popular account of his voyage, *Farthest North*. See NORTH POLAR EXPLORATION.

Nantes, *nahNt*, a town of France, capital of the Department of Loire-Inférieure, on the Loire, 250 mi. s. w. of Paris. The situation, on an important navigable river, within 40 miles of the ocean, is highly advantageous for commerce. Among the chief public buildings are the Cathedral of Saint Pierre, the castle of the old dukes of Brittany, the Hotel de Ville, the museum of natural history, the museum of painting and the theaters. The chief industries of the town are shipbuilding, the manufacture of ships' boilers and machinery, linens, cottons, sail cloth, leather and soap, and the production of tobacco and sardines. Before the conquest of Gaul by the Romans, Nantes was a place of some note. For a long time it formed one of the most valuable possessions of the dukes of Brittany, but in 1499, when Anne of Brittany married Charles VIII, it passed with the rest of her possessions to the crown of France. The most famous event in its history was the issuing of the famed Edict of Nantes (See NANTES, EDICT OF). In 1793 it was the scene of some of the most atrocious massacres of the French Revolution. As many as six hundred people are known to have perished in one day, and thousands were killed in the town and surrounding country. Population in 1911, 170,535.

Nantes, EDICT OF, a decree issued by Henry IV of France, April 13, 1598, ending the religious wars of the country. It put the Huguenots on an equality with the Catholics in political rights and conceded them greater freedom of worship than they had formerly enjoyed. They were allowed to establish new churches, except in Paris and the surrounding districts and in royal residences, and to maintain their four theological colleges; but they must celebrate the Catholic festivals and pay tithes to the Catholic priesthood. In 1685, by a decree of Louis XIV, the edict was revoked. As a consequence of this act, about 500,000 of the Huguenots emigrated to other countries.

Nan'ticoke, PA., a borough in Luzerne co., 8 mi. s. w. of Wilkesbarre, on the Susquehanna River and on the Pennsylvania, the Lackawanna and other railroads. The mining of anthracite coal is the principal industry, and there is also considerable manufacturing of implements, hosiery, flour, cigars and other articles. It was settled about 1850 and was incorporated in 1874. Population in 1910, 18,877.

Nantuck'et, an island off Massachusetts, 18 mi. s. of Cape Cod, 15 mi. long and from 3 to 4 mi. wide. The town of Nantucket is situated on the south side of the island and has a deep and secure harbor. It was formerly an important port for whaling vessels. The climate of Nantucket is mild in winter and cool in summer, and the place is a popular summer resort.

Naphtali, *nafta li*, (my wrestling), the sixth son of Jacob and the head of one of the twelve tribes. The tribe had its full share in repelling the incursions of the Canaanites during the first centuries of the conquest, but it disappeared from history when Tiglath-Pileser overran the north of Israel and bore away the whole of the population to Assyria. Under the name Galilee, the district occupied by the tribe became in New Testament times more famous than it had ever been before.

Naphtha, *naft'ha* or *nap'tha*, the name first given to the mineral oil now known as petroleum, and now used to include most of the inflammable liquids produced in distilling animal or vegetable substances. Petroleum is now sometimes called native or mineral naphtha. Another liquid produced by the distillation of bog-head coal, is known as bog-head naphtha. The name is also applied in a general way to the light liquids formed in the distillation of petroleum and used in the manufacture of varnishes. These are divided into gasoline, benzine and naphtha,

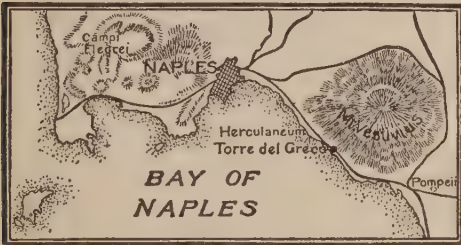
Napier

of which naphtha is the heaviest and contains the largest proportion of oil. This naphtha is sometimes sold under the name of petroleum spirit or petroleum ether. See PETROLEUM.

Napier, *na'py ur*, a town situated on the north island of New Zealand. It is important because of its excellent harbor. It is the terminus of a railway extending into the interior of the island, and it has a museum and fine municipal buildings. Napier is in the center of a grazing region and is a wool market of considerable importance. It also exports large quantities of canned and frozen meats. Population in 1911, 10,537.

Napier, *nape'yur* or *na peer'*, JOHN (1550-1617), a Scotch mathematician, born near Edinburgh. His fame rests chiefly on his invention of logarithms. The invention was very soon known over all Europe and was everywhere hailed with admiration by men of science. See LOGARITHMS.

Naples, *na'pl'z*, a city in southern Italy, the largest in the kingdom, situated on the northern shore of the beautiful Bay of Naples, at the foot of Mount Vesuvius, about 120 mi. s. e. of Rome. It is built partly along the shore, partly on the



slope of the hills, and is one of the most picturesque cities of the world. In the modern part of the city there are wide, regular, well-kept streets, but the older portion is comparatively unattractive. Among the chief buildings are the cathedral, begun in the thirteenth century; the churches of San Paolo Maggiore, San Domenico Maggiore, the Annunziata and other churches to the number of four hundred; the royal palace, with its noteworthy paintings; the old palace, and the national museum, which contains a remarkable collection of antiquities from Pompeii and Herculaneum. The city has a university which dates from the thirteenth century and which is attended by about five thousand students. There are also schools of medicine, engineering, music and military affairs, besides numerous hospitals and charitable institutions. The city is well supplied

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with street railways, which connect it, also, with various towns in the surrounding country.

The manufactures of Naples, which are numerous but individually unimportant, include macaroni and vermicelli, silks, cottons and woollens, glass, china, musical instruments, artificial flowers, perfumery, soap, machinery and many other articles. The harbor accommodations are excellent, and the trade is second in importance among Italian cities. Naples is one of the most densely populated cities in Europe. In the environs are situated the tomb of Vergil, the ancient Roman cities of Herculaneum and Pompeii and the remains of Roman temples, villages, palaces and tombs.

Naples was founded by a Greek colony from the town of Cumae many centuries B. C. It took the name of Neapolis (New City) to distinguish it from an older Greek city adjoining, called Parthenope. Naples passed to the Romans in the third century B. C. and under them flourished for several centuries. After the fall of the Western Roman Empire, the Ostrogoths held the city for a time, and from them it passed to the Byzantines in the sixth century. In 1130 the Norman Robert Guiscard united the south of Italy and the adjacent island of Sicily into one state, and from that period the history of Naples ceases to be the history of a city and becomes a part of the history of the Kingdom of the Two Sicilies, of which Naples was recognized as the metropolis (See SICILIES, KINGDOM OF THE TWO). Population in 1911, not including suburbs, 678,031.

Naples, BAY OF, an inlet of the Mediterranean, on the west coast of Italy, extending for about 22 mi. from Cape Miseno, its northern limit, to Cape Campanella, its southeast limit. It is separated from the open sea by the islands of Procida, Ischia and Capri. Its shores have been for ages the scene of powerful volcanic agency, and the scenery has long been celebrated for its beauty and grandeur. Mount Vesuvius is the most distinctive and striking feature.

Napoleon I (1769-1821), emperor of the French, was born at Ajaccio, Corsica, and was the son of Charles Bonaparte, an advocate, and of Letizia Ramolino. In his tenth year he was sent to the military school of Brienne, and after a short time spent at the military school of Paris he received his commission as lieutenant of artillery. In 1792 he became captain of artillery, and in 1793 he was sent to assist in the reduction of Toulon, then in the hands of the British. The

place was captured almost entirely through his strategic genius; and in the following February he was made a brigadier general of artillery. In 1795, when the mob of Paris rose against the Convention, Napoleon was made commander of the five thousand troops provided for its defense. He had only a night to make arrangements, and next morning he cleared the streets with grape, disbanded the National Guard, disarmed the populace and ended the outbreak. Early in 1796 Bonaparte married Josephine de Beauharnais, and soon after he had to depart to assume the command of the army of Italy against the forces of Austria and Sardinia. By a series of victories, culminating in that of Lodi, he forced Naples, Modena and Parma to conclude a peace; the pope was compelled to sign an armistice, and the whole of northern Italy was in the hands of the French. Army after army sent by Austria was defeated, and Napoleon carried the war into the enemy's country and by the Peace of Campo Formio, 1797, compelled Austria to cede the Netherlands and Lombardy in return for the Province of Venetia. The pope had previously been forced to cede part of his dominions.

In December, 1797, Napoleon returned to Paris, where his favor with the people was great. The Directors, fearing him on account of his newly acquired influence, were anxious to get him out of France, and a plan soon presented itself. Realizing that, after Austria, England was the most dangerous enemy which France had, the Directors determined to strike a blow at her by invading Egypt, as a preliminary step to the conquest of British India. Napoleon was put in command of the expedition, and in July, 1798, he landed at Alexandria. This city fell after a short resistance, and Cairo was taken within the same month, after the sanguinary Battle of the Pyramids. In August the word reached the army in Egypt that Nelson had annihilated the French fleet in the Bay of Aboukir. All means of return to Europe for the French were thus cut off; but Napoleon, having suppressed with rigor a riot in Cairo, advanced to attack the Turkish forces assembling in Syria. He took El Arish and Gaza and stormed Jaffa; but after sixty days' siege he was compelled to abandon the attempt to capture Acre, which was defended by a Turkish garrison, assisted by Sir Sidney Smith and a small body

of English sailors and marines. Bonaparte returned to Egypt in June, 1799, and in July attacked and almost annihilated a Turkish force which had landed at Aboukir. On August 22 he abandoned the command of the army to Kléber and sailed for France, having learned that the Directory was in danger through a royalist rising and that the people were longing



NAPOLÉON BONAPARTE

for a return of some sort of order. He secured the coöperation of his brother Lucien, Talleyrand, Siéyès and others, and by a sudden stroke he abolished the Directory on the 18th and 19th Brumaire (November 9 and 10). A new constitution was then drawn up, chiefly by Siéyès, under which Napoleon was made first consul, with Cambacérès and Lebrun as second and third consuls. From

Napoleon

this time Napoleon was virtually ruler of France.

His government was marked by sagacity, activity and vigor in the administration of civil affairs, by the proclamation of complete freedom of religious worship, by the reconstruction of the school system and by the compilations of the famous body of laws known as the Code Napoleon. But war was his element, and in 1800 he resolved to strike a blow at Austria. Having executed a daring march into Italy across the Great Saint Bernard, he defeated the Austrians at Marengo, and after the decisive Battle of Hohenlinden forced Austria to conclude peace by the Treaty of Lunéville. Treaties were subsequently concluded with Spain, Naples, the pope, Bavaria, Portugal, Russia and Turkey, and finally, the Treaty of Amiens was signed by England. In 1802 Napoleon was proclaimed by a decree of the senate consul for life, and in 1804 he had himself crowned as emperor, upward of three million votes of the people being given in favor of this measure.

In 1803 war had again broken out with Great Britain, and Napoleon collected an army and flotilla which were to invade England. In 1805 Britain, Russia, Austria and Sweden united against Napoleon, who marched at once across Bavaria at the head of the army collected for the invasion of England and compelled the Austrian General Mack to capitulate at Ulm. This surrender occurred on the day before Nelson by his great victory at Trafalgar established the British supremacy on the sea. In November, Napoleon entered Vienna, and in the following month he completely routed the allied Russian and Austrian armies at Austerlitz. This was one of his greatest victories, and the Austrian emperor immediately sued for peace, giving up to France all his Italian and Adriatic territories. Napoleon now turned to the organization of the territory which had come into his power. Early in 1806, a French army occupied the continental part of the Neapolitan states, and Joseph Bonaparte was declared king, on the deposition of their former sovereign. Another brother of the emperor, Louis, became king of Holland, and various districts in Germany and Italy were erected by the conqueror into dukedoms and bestowed upon his most successful generals. This brought him into collision with Prussia, and war was declared. Late in 1806 Napoleon defeated the enemy at Jena, while one of his generals on the same day gained the victory of Auerstädt. On October

Napoleon

25 Napoleon entered Berlin and issued the celebrated Berlin Decree, thus instituting the important Continental System. He then marched northward against the Russians, who were advancing to assist the Prussians. At Pultusk and at Eylau he met with severe checks; but in the summer of 1807 the Battle of Friedland was fought, which was so disastrous to the Russians that Alexander was compelled to sue for an armistice. The result was the Peace of Tilsit, by which the king of Prussia received back half of his dominions and Russia undertook to close her ports against British vessels. The duchy of Warsaw was erected into a kingdom and given to the king of Saxony; the kingdom of Westphalia was formed and bestowed upon Jerome, Napoleon's youngest brother; Russia obtained a part of Prussian Poland, and by secret articles she was allowed to take Finland from Sweden.

As Portugal had refused to respect the Berlin Decree, Napoleon now sent Junot to occupy Lisbon; and because the administrative affairs of Spain had fallen into confusion, he sent into that kingdom an army under Murat, which took possession of the capital. By the Treaty of Bayonne Charles IV was obliged to resign the Spanish crown, which was given to Joseph Bonaparte, Murat receiving the vacant sovereignty of Naples. The great body of the Spanish people rose against this summary disposal of the national crown, and Britain aided them in their resistance. Thus was begun the Peninsular War, which lasted seven years. In the meantime Austria again declared war and got together an army in splendid condition, under the Archduke Charles. Napoleon hurried into Bavaria, encountered the archduke at Eckmühl, completely defeated him and entered Vienna.

He was himself defeated at Aspern and Esslingen; but at Wagram (1809) the Austrians were completely crushed, and Napoleon was thus enabled to dictate his own terms of peace. On his return to Paris, Napoleon divorced Josephine, who had borne him no children, and soon afterward married the Archduchess Maria Louisa of Austria, thus entering into closer relations with that country.

The years 1810 and 1811 were the period of Napoleon's greatest power. But now the tide began to turn. Russia found it impossible to carry out the continental blockade and give due effect to the Berlin Decree; so in May, 1812, Napoleon declared war against that country and

Napoleon

soon invaded it with an army of nearly six hundred thousand men. The Russians retired step by step, wasting the country, carrying off all supplies and avoiding as far as possible general engagements. The French pushed rapidly forward, defeated the Russians at Borodino and elsewhere and entered Moscow only to find the city on fire. It was impossible to pursue the Russians farther, and nothing remained but retreat. The winter was uncommonly severe, and swarms of mounted Cossacks incessantly harassed the French, now sadly demoralized by cold, famine, disease and fatigue. Of the invaders, only about twenty-five thousand left Russia. Napoleon immediately ordered a fresh conscription, but the spirit of Europe was now fairly roused. A coalition, consisting of Prussia, Russia, Great Britain, Sweden and Spain, was formed, which early in 1813 sent its forces toward the Elbe. Napoleon defeated the allies at Lützen, at Bautzen and at Dresden; but the last was a dearly-bought victory for the French, who were now so outnumbered that their chief was compelled to fall back on Leipzig. There he was completely hemmed in, and in the great "Battle of the Nations," which was fought October 16, 18 and 19, he was completely defeated. He succeeded in raising a new army, and from January to March, 1814, he confronted the combined hosts of the allies. But numbers were against him; and Wellington rapidly advanced upon Paris from the south. The last of March the allies captured the fortifications of Paris and entered the city, and early in the following month Napoleon abdicated at Fontainebleau. He was allowed the sovereignty of the island of Elba, with the title of emperor and a revenue of six million francs.

After a residence of ten months he made his escape from the island and landed at Fréjus, March 1, 1815. Ney and a large part of the army joined him, and he made a triumphal march upon Paris, driving Louis XVIII from the throne. The allied armies once more marched toward the French frontier, and Napoleon advanced into Belgium to meet them. June 16 he defeated Blücher at Ligny, while Ney held the British in check at Quatre-Bras. Wellington fell back upon Waterloo, where he was attacked by Napoleon on the 18th, the result being the total defeat of the French. The allies marched without opposition upon Paris. Napoleon abdicated in favor of his son and tried to escape from France, but failing, he surrendered to the captain of a British man-of-war. With the approval

Napoleon

of the allies he was conveyed to the island of Saint Helena, where he was confined for the rest of his life. He was buried in the island, but in 1840 his remains were transferred to the Hôtel des Invalides at Paris.

Napoleon II. See REICHSTADT, NAPOLEON FRANÇOIS JOSEPH BONAPARTE, Duke of.

Napoleon III, CHARLES LOUIS NAPOLEON BONAPARTE (1808-1873), emperor of the French. He was the youngest son of Louis Bonaparte, brother of Napoleon I and king of Holland, and of Hortense Beauharnais. By the death of his cousin, the Duke of Reichstadt, he became the recognized head of the Bonaparte family, and from this time forward his whole life was devoted to the realization of a fixed idea that he was destined to occupy his uncle's imperial throne. In 1836 an attempt was made to secure the garrison of Strassburg, but the affair turned out a ludicrous failure. In 1840 he made a foolish and theatrical descent on Boulogne, was captured, tried and sentenced to perpetual confinement in the fortress of Ham, but after six years in prison he escaped to England. On the outbreak of the Revolution of 1848, he hastened to Paris, and securing a seat in the National Assembly, he began at once his candidacy for the presidency. On the day of the election, it was found that he had received a majority of four million. Although he took the oath of allegiance to the Republic, he looked forward to a higher position. At last, in December, 1851, the president declared Paris in a state of siege, issued a decree dissolving the Assembly and another ordering the reëstablishment of universal suffrage and the election of a president for ten years. When the vote came to be taken, an enormous majority was in favor of his retaining office for ten years, with all the powers he demanded.

As soon as he found himself fully confirmed in this ambition, he began to prepare for the restoration of the Empire. In January, 1852, the National Guard was revived, a new constitution was adopted and new orders of nobility were issued; and at last, on December 1, Louis Napoleon Bonaparte was proclaimed emperor, under the title of Napoleon III. In March, 1854, Napoleon III, in conjunction with England, declared war in the interest of Turkey against Russia; and in 1859, when war was declared between Austria and Sardinia, Napoleon took up arms in favor of his Italian ally, Victor Emmanuel. The allies defeated the Austrians at Montebello, Magenta, Marignano and Solferino, and France won much glory from these

Narbada

victories. In 1860 the emperor sent out an expedition to China to act in concert with the British; and in 1861 France, England and Spain agreed to dispatch a joint expedition to Mexico for the purpose of exacting redress of injuries, but the English and Spaniards soon withdrew. The French continued the quarrel, and an imperial form of government was instituted, Maximilian, archduke of Austria, being placed at its head, with the title of emperor. Napoleon, however, withdrew his army in 1867, and the unfortunate Maximilian, left to himself, was captured and shot. On the conclusion of the Austro-Prussian War of 1866, Napoleon, jealous of the growing power of Prussia, demanded a reconstruction of frontier, which was peremptorily refused. The ill-feeling between the two nations was increased by various causes, and in 1870, war was declared by France. Prussia was well prepared for the struggle, which had long been foreseen in that country, but Napoleon seems to have been greatly deceived as to the state of France. The disastrous close of the war, therefore, was a great surprise to him (See FRANCO-GERMAN WAR). After the surrender at Sedan he was kept a prisoner for a time at the Castle of Wilhelmshöhe, and then he joined his wife and son in England, where he remained till his death. His only child, the prince imperial, who joined the British army in South Africa as a volunteer, was killed by the Zulus.

Narbada, *nar bud'a*. See NERBUDDA.

Narbonne, *nahr 'un'*, a town of France, in the Department of Aude. Its most interesting building is the old cathedral begun in the Middle Ages and now known as the Church of Saint Just. The manufactures of the city, which include verdigris, candles, pottery and leather, are comparatively unimportant. The honey of Narbonne is celebrated. The city was the first colony which the Romans founded beyond the Alps, and it grew to be the metropolis of southern Gaul. Despite this fact, it is very poor in Roman remains. Population in 1911, 27,000.

Narcissus, *nar sis'sus*, according to Greek mythology, the son of the river god Cephissus, of great beauty, but excessively vain. Echo, a nymph who loved him, pined away to a mere voice, because her love for him found no return, and Nemesis, determined to punish him for his coldness of heart, caused him to drink at a certain fountain, wherein he saw his own image, with which he fell violently in love. With this passion he, too, pined away, until the gods trans-

Narcotic

formed him into the flower which still bears his name.

Narcissus, an extensive genus of bulbous plants, mostly natives of Europe. The species are numerous, and from their hardiness, delicate shape, gay yellow or white flowers and sweet fragrance, they have long been favorite objects



NARCISSUS

of cultivation, especially the daffodil, the jonquil and the white narcissus. Some of the more hardy species grow wild in English woods and under English hedges.

Narcotic, a substance which, in small doses, diminishes the action of the nerves and brings on sleep. Most narcotics are stimulating when given in moderate doses; in larger doses they produce sleep, and in poisonous doses they bring on stupor, convulsions and even death. Opium, hemlock, henbane, belladonna, aconite, camphor, digitalis, tobacco, alcohol, leopard's bane are well-known narcotics, and of late years there has been introduced a new series, derived from coal tar. These include phenacetine, acetanilid and sulphonal. While narcotics are at times absolutely necessary to relieve pain or induce sleep, their action is so uncertain and so dependent on the physical condition of the person to whom they are administered that they should seldom if ever be used without expert advice.

Narragansett

Nar'ragan'sett, in colonial times, a leading indian tribe occupying Long Island and the present State of Rhode Island. They cherished the friendship of Roger Williams, but joined in King Philip's War, losing nearly 1000 men in the famous Swamp Fight. After the death of their leader, Canonicus, they were quickly subdued, and now survive only in mixed bloods.

Narragansett Bay, an inlet of the Atlantic which extends into Rhode Island for about 28 mi., almost to Providence. Newport is situated near the southern end of the bay and Providence at the head.

Narses, *nahr'seez* (? -568), a famous general of the Eastern Roman Empire. Under Justinian he rose to high rank, and fought in Italy against the Goths, first as the associate and later as the successor of Belisarius (see **BELISARIUS**). He finally, in 553, completely overthrew Gothic power in the peninsula. As exarch of Italy he proved himself as able a statesman as he was a general, but he was accused, with apparent justice, of avarice. Little is known of the last years of his life.

Narvaez, *nahr vah'ath*, **PANFILO DE** (1470?-1528), a Spanish adventurer and explorer, who, in 1528, left Cuba with an expedition for the purpose of exploring the southeastern part of what is now the United States. He was betrayed and misled by indian guides and was finally forced to put to sea. After cruising along the Gulf coast for several months, most of the party were swept to their destruction by the rush of waters from the Mississippi.

Narvaez, **RAMON MARIA**, Duke of Valencia (1800-1868), a Spanish statesman and general. Early in life he entered the Spanish army and rapidly acquired distinction. When Gomez, the Carlist general, was engaged in his adventurous march through Spain, in 1836, Narvaez was directed to pursue him and totally routed him near Arcos. He then devoted himself to politics and became the rival of Espartero himself. Having taken part in an unsuccessful rising against Espartero, he fled to France. In 1843 he hastened to Spain, put himself at the head of an insurrection and entered Madrid. In the following year he formed his first ministry and received from Queen Isabella the rank of marshal and the title of duke of Valencia. His government was overthrown in 1846, but he was soon recalled, and during the remainder of his life he was several times entrusted with the formation of a cabinet.

Narwhal, *nahr'wal*, a marine mammal found

Nashville

in the northern seas, averaging from twelve to twenty feet in length. The body color is whitish or gray, spotted with darker patches. There is no dorsal fin. It has a straight, spiral horn, tapering to a point and measuring in length from six to eight feet. This horn is of a fine white



NARWHAL

material, somewhat like ivory, and it serves as a dangerous weapon against an enemy. The narwhal has obtained the name of the *sea unicorn*, *unicorn fish* or *unicorn whale*. The food of the narwhal appears to consist chiefly of mollusks. The Greenlanders obtain oil from the blubber and manufacture the skins into various useful articles.

Nasal, *na'zal*, **Duct**. See **LACHRYMAL GLANDS**.

Nas'by, **PETROLEUM V.** See **LOCKE**, **DAVID R.**

Naseby, *naz'by*, **BATTLE OF**, a famous battle, fought on June 14, 1645, in the parish of Naseby, in Northampton, England. The struggle was between Charles I and the Parliamentary army under Fairfax and Cromwell, and it ended in the complete defeat of the royalists.

Nash'ua, **N. H.**, one of the county-seats of Hillsboro co., about 33 mi. s. of Concord, on the Nashua River near the Merrimac, and on several divisions of the Boston & Maine railroad. In size it is the second city in the state. A canal from the Nashua to the Merrimac furnishes good water power, and there are large cotton mills, and manufactures of machinery, paper, boilers, furniture, shoes, saddlery and hardware. The city has a public library, a United States fish hatchery and the Saint Francis Xavier church, which is one of the finest in the state. The place was settled in 1655. It was incorporated as the Township of Dunstable in 1673, was given its present name in 1746 and was chartered as a city in 1853. Population in 1910, 26,005.

Nashville, **TENN.**, the Rock City, the capital of the state and the county-seat of Davidson co., 209 mi. w. by n. of Memphis and 186 mi. s. by w. of Louisville, Ky., on both sides of the Cumberland River, which is spanned by four or five costly bridges, and on the Nashville, Chattanooga & Saint Louis, the Tennessee Central

and eight lines of the Louisville & Nashville Railroad. It is the center of an extensive system of turnpikes and good roads traversing the whole of the Middle Tennessee basin. Trolley lines run to Franklin and Gallatin. The city is regularly laid out on the river bluffs. There are several public parks, of which the Centennial, containing the Parthenon, is the most important. Mount Olivet Cemetery is a beautiful burying ground, and there is a large national cemetery north of the city. The state capitol, on Cedar Hill, is the most prominent structure in the city. Near it are the tomb of James K. Polk and an equestrian statue of Andrew Jackson. The charitable institutions include the state hospital for the insane and the Saint Thomas, the Gallo-way Memorial, and the City hospitals. Nashville is a very important educational center, containing Vanderbilt University, the George Peabody College for Teachers, Knapp School of Farm Life, Fisk University (for negroes), Radnor College, Ward-Belmont College (for women), Boscobel College and several preparatory and business schools. The state institutions for the blind and the state industrial school are also located here. The city has a Carnegie library, a state library and the Watkins Institute. A short distance from the city is Andrew Jackson's home, "The Hermitage."

The city is an important trade center and ships large amounts of agricultural implements, grain, livestock, seeds, boots and shoes, lumber products, hardware, dry goods, hats and other goods. The manufacturing establishments are numerous and varied, including flour and grist mills, stove foundries, wooden ware factories, fertilizer works and harness, clothing, tobacco and other factories. The place was settled in 1780 and named in honor of Abner Nash, then governor of North Carolina. It was incorporated as a city in 1806. In 1862 the city was occupied by a Federal army, and it was the scene of the Battle of Nashville in 1864. Population in 1910, 110,364.

Nashville, BATTLE OF, an important battle of the Civil War, fought at Nashville, Tenn., December 15 and 16, 1864, between a Federal force, under General Thomas, and the Confederate Army of the Tennessee, under General Hood. The latter had evacuated Atlanta early in September and had struck northward, hoping to draw Sherman from his proposed march to the sea. Sherman dispatched Thomas to defend Tennessee and provided him with able assistants, including generals Schofield and

Smith and cavalry under General Wilson, numbering all told about fifty-five thousand. At Franklin, on November 30, General Hood attacked General Schofield, who was slowly retreating toward Nashville, and was repulsed. The Confederates reached the vicinity of Nashville December 2, but Thomas did not offer battle for two weeks, though urged and ordered to do so and even threatened with dismissal. At last, on December 15, he proceeded against the Confederate position, and after a battle lasting for two full days, the Confederates were almost surrounded and compelled to withdraw. Harassed by Federal cavalry, they began a retreat which soon became a rout. So complete was the disaster, that the Confederate force was never reorganized, and General Hood asked to be relieved of his command. The loss of the Federals was incredibly small, in view of the heavy fighting.

Nashville, UNIVERSITY OF, a co-educational institution, established at Nashville in 1785, by the State of North Carolina, under the name of Davidson Academy. When Tennessee became a state, the name of the school was changed to Cumberland College, and later it became the University of Nashville. The Civil War necessitated closing the institution, but in 1875 the trustees of the university, together with the trustees of the Peabody Educational Fund, established in its place a normal school for the training of teachers. Preparatory, collegiate and medical departments have since been added, and the university is now in a prosperous condition. The faculty numbers about thirty-five, and the average enrollment of students is about 900. The library contains 20,000 volumes, the endowment fund is about \$107,000 and the annual income, about \$80,000.

Na'smyth, JAMES (1808-1890), a Scotch engineer, born and educated at Edinburgh. He became a manufacturer of machine tools, in which he developed a large industry. The steam hammer, which has rendered possible the immense forgings now employed, was invented by him in 1839. The steam pile driver and the safety foundry ladle are among his other inventions. He has also acquired fame as an astronomer. See STEAM HAMMER.

Nast, THOMAS (1840-1902), an American caricaturist, born in Bavaria and brought to the United States in 1846. After service in England and Italy, he began drawing war sketches for *Harper's Weekly* in 1862. In his particular line, pictorial satire, Nast stands in the foremost

rank. By his severe and pointed caricatures, he did much toward breaking up the notorious Tweed "ring" of New York. Nast also produced some creditable oil paintings.

Nasturtium, *nas tur'shum*, the name applied by the botanist to the watercress. It is also the common name of a cultivated plant, often trailing or climbing, which produces curious round



NASTURTIIUMS

leaves and large, irregular flowers of brilliant colors. There are many species of nasturtiums, natives of South America and Mexico, but they are extensively grown in the United States, where they are a favorite garden flower.

Natal, *na tahl'*, a British colony on the southeast coast of Africa, northeast of Cape Colony and southwest of the Transvaal colony. Zululand and a part of the territory which formerly belonged to the Transvaal Republic have of late years been annexed to Natal, which now has an area of about 35,371 square miles. The only spot where sheltered anchorage can be obtained is at Port Natal, a fine circular bay near the center of the coast. The soil is generally rich and strong, and wheat, barley, oats, maize, beans and vegetables of almost every

description have been largely and successfully grown. In many parts vines and fruit trees thrive, and in the coast region cotton, tobacco, indigo, sugar cane and coffee grow well. In the less frequented parts of the interior, elephants and lions are still occasionally seen, and hyenas, tigers, antelopes, jackals and porcupines are numerous. The mineral productions are principally coal, iron, limestone and marble. The trade of the colony is extensive, and the principal exports are coal, gold, wool, sugar, hides and bark.

Natal was discovered on Christmas Day, 1497, by Vasco de Gama and was named by him in honor of the day (the Nativity). The first permanent settlers of the territory were Dutch Boers, who left Cape Colony in 1836, entered Natal and three years later proclaimed themselves an independent republic. The establishment of a hostile settlement at the only port between Algoa and Delagoa bays was incompatible with British interests, and in 1843 Natal, after a determined resistance by the Boers, was proclaimed a British possession. In 1858 it was proclaimed a separate colony. During the South African War considerable fierce fighting occurred in Natal, some of the most important battles of the war taking place at Glencoe, Ladysmith and all along the line of the Tugela (See SOUTH AFRICAN WAR). The capital is Pietermaritzburg. The population in 1911 was 1,194,043, of whom 98,114 were white.

Natch'ez, Miss., the county-seat of Adams co., 100 mi. s. w. of Jackson, on the Mississippi River and on the New Orleans & Northwestern and the Yazoo & Mississippi Valley railroads. The city is situated on a bluff, which rises to an elevation of 200 feet above the river. It has many fine residences, good city and county buildings, several large hotels, the Fisk Library, Memorial Park, Stanton College, Natchez Institute, Temple Opera House and Institute Hall. A large national cemetery adjoins the city. The industrial establishments include cotton mills, compresses and oil mills, planing mills, an ice plant and other factories. A fort was built on the site of Natchez by the French in 1716, but it was destroyed by the Indians in 1729. The city practically began when the English took possession of the old fort in 1763, according to the terms of the Treaty of Paris. The Spaniards captured the place in 1779, but gave way to the United States in 1798. Natchez was made a city in 1803 and was the capital of

Mississippi from 1798 to 1820. During the Civil War it was taken by Federal troops in 1863, soon after the fall of Vicksburg, and was held until the end of the war. Population in 1910, 11,791.

Na'tick, MASS., a town in Middlesex co., 17 mi. s. w. of Boston, on the Charles River and on the Boston & Albany railroad. It was settled by John Eliot in 1651 and was used by the founder until his death, chiefly as a home for converted indians. It was incorporated as a town in 1781. The principal manufactures are clothing, boots, shoes, tools and sporting goods. The town contains the Bacon Public Library, Morse Institute, the Walnut Hill High School, a public park, a soldiers' monument and one to John Eliot. Population in 1910, 9866.

National Academy of Design, an institution established in New York City in 1825 by a company of artists. Three years later it was incorporated, and Professor Morse, the inventor of the telegraph, was its first president (See MORSE, SAMUEL F. B.). The membership does not exceed 100 and is confined strictly to artists, though others may obtain honorary memberships or fellowships which entitle them to certain privileges. The academy holds an annual exhibition, at which prizes are awarded for the most meritorious work. It also maintains a school of design, with classes in life, still life, anatomy, antique, painting, etching and other lines of artistic work.

National Academy of Sciences, an organization incorporated by Congress in 1863 for the purpose of investigating, experimenting and reporting on subjects of scientific note when required so to do by any department of the United States government. The membership is restricted to noted scientists and does not exceed one hundred. The members are divided into six groups, styled committees, each group having charge of a special line of research. The academy holds two meetings a year and awards medals for specially meritorious work in original research.

National Civic Federation, an organization formed in New York in 1901, for the purpose of considering and promoting means for securing industrial peace. The organization was the result of several conventions held in Chicago and New York, in which representative leaders of both capital and labor presented their views concerning measures for securing arbitration in industrial disputes. Finally, in December, 1901, a commission of 36 members, known as the industrial department, was established. It contained in its membership, besides

well-known employers, the chosen representatives of organized labor and selected representatives of the interests of the public; it included Grover Cleveland, Charles W. Eliot, Archbishop Ireland, Mark Hanna, John D. Rockefeller, Samuel Gompers and John Mitchell. Besides attempting to prevent strikes and lockouts and to secure friendly relations between capital and labor, the members of the commission were to offer their services as a board of arbitration in labor disputes which had reached an acute stage. Though in the first years of the movement this board failed to accomplish all that its founders had hoped, it was instrumental in settling many strikes and in preventing many others.

National Debt, the aggregate of money owed by a government to individuals, corporations or other governments, for amounts advanced or assessed for war or commercial purposes. At various periods statesmen have become alarmed over the great increase in the public debts of given nations, but experience has proved their fears to be in the main groundless. When Adam Smith, the noted writer on political economy, entered his protest against "the progress of the enormous debts which at present (in 1776) oppress, and will in the long run probably ruin, all the great nations of Europe," the public debts of the entire civilized world were less than one tenth of their present aggregate, which is estimated in round numbers to be in the neighborhood of \$29,000,000,000.

The English national debt was mainly acquired during the wars with Napoleon, but the debts of other European countries have been contracted largely since the middle of the nineteenth century. In 1862 foreign national bonds to the amount of nearly \$3,500,000,000 were quoted on the London Stock Exchange, and within a decade this amount had increased to about \$12,500,000,000. The change in national debts during the last of the nineteenth century and the first of the twentieth is shown here:

	1870	1912
France.....	\$4,500,000,000	\$6,283,675,000
United Kingdom.....	3,900,000,000	3,485,818,000
Austria-Hungary.....	1,750,000,000	1,051,346,000
Russia (European).....	1,700,000,000	4,553,488,000
Italy.....	1,950,000,000	2,706,609,000
United States.....	2,220,000,000	2,906,750,548
Spain.....	1,375,000,000	1,815,691,000
Germany.....	1,000,000,000	1,177,418,000
Australasia.....	230,000,000	1,181,192,157
Turkey.....	675,000,000	554,441,000
Portugal.....	345,000,000	968,324,000
Brazil.....	475,000,000	663,667,000
Egypt.....	375,000,000	459,153,000
Canada.....	62,500,000	508,339,000

Spain owes, comparatively, the largest proportion to foreign lenders, while France owes the largest share of its debt to its own citizens. France takes the lead as a lending people, on account of the good financial standing and the saving propensities of its people. At present the total aggregate of interest paid annually on public debts in the world is \$1,686,763,000, while twenty-five years ago it was \$1,000,000,000, although the total debt at that time was \$5,000,000,000 less than at the present. France pays in interest money about \$185,775,000; Great Britain's annual interest is \$119,229,000; Italy's \$97,074,000; Germany's \$57,128,000, Austria-Hungary's \$42,695,000, and that of the United States \$22,616,000.

The national debt of the United States at the close of the War of 1812 was \$45,209,737. In 1832 it had been diminished to \$24,322,235, and in 1835, to the minimum of \$37,513. By 1850 it had risen again to \$63,452,773, and at the breaking out of the Civil War it was \$90,580,873. The following figures show the increase caused by the war, the gradual decline after the close of the war, and the marked increase since 1890:

1862.....\$ 524,176,412	1880....\$2,128,791,054
1863.....1,119,772,138	1890....1,549,206,126
1864.....1,815,784,370	1900....2,132,373,031
1865.....2,680,647,869	1905....2,293,846,382
1866.....2,773,236,173	1910....2,704,142,281
1876.....2,180,395,067	1912....2,906,750,548

National Education Association. See EDUCATION ASSOCIATION, NATIONAL.

National Guard, the name given to the militia organized in France at the time of the Revolution. It was introduced into Paris in 1789, was made up largely of the citizen class and was under municipal control. The membership in Paris was about 48,000, while it was reported that throughout the country the membership approached 4,000,000. In 1795 Napoleon defeated and broke up the National Guard, which had attempted to overthrow the Convention. Ten years later he reorganized it and made use of it in his latter campaigns. During the nineteenth century it was several times dissolved and reestablished, and its final dissolution took place after the insurrection of the Commune in 1871. In the United States, the term is applied to the militia organized and maintained by the states. See MILITIA.

National Museum of the United States. The choicest of the wonderful collections of historic articles, of animals, plants and the various things collected by government scientific expeditions are housed in the elegant building near

the Smithsonian Institution, on the west side of the Mall, at Washington. In the center of the building is the rotunda and dome, where, above the fountain's basin, is the plaster cast of Crawford's *Statue of Liberty*, that surmounts the dome of the Capitol. Among the historic relics of particular interest are articles that belonged to Washington, Jefferson, Jackson, Franklin and General Grant. An almost endless number of articles illustrate the costumes and manners of life of all the races from the Aborigines of America to the most civilized peoples of Europe. Besides these, there is a marvelously rich collection of natural history specimens and many life-like groups of rare stuffed animals. Although the halls of the National Museum are already crowded, they contain only a part of the great collections belonging to the government.

National Party. See POPULIST PARTY.

National Republican Party. See WHIG.

National Road. See CUMBERLAND ROAD.

Nations, LAW OF. See INTERNATIONAL LAW.

Nat Turner Insurrection. See TURNER, NAT.

Natural Bridge, a bridge formed by the wearing away of strata of soft rock overlaid by harder rock, thus leaving an arch. A famous natural curiosity of this sort is the Natural Bridge across Cedar Creek, Va., about 125 miles



NATURAL BRIDGE, VIRGINIA

west of Richmond. The sides are nearly perpendicular; the arch is 215 feet high and from 50 to 100 feet wide, with a span, in its broadest part, of 90 feet. Three natural bridges have been discovered recently in Utah, each being larger than the one in Virginia. The Augusta

Natural Gas

Bridge in Utah is the largest natural bridge in the world.

Natural Gas, a gas found issuing naturally from crevices in the earth's crust in certain places, but obtained for economic purposes by boring wells. It is usually found in the same localities as petroleum and sometimes is confined under great pressure, so that when the well strikes the chamber, the gas rushes out with considerable force. The most important natural gas regions in the United States are in and about Pittsburgh, Pa., in southern Ohio and in central Indiana. The gas is valuable for heating purposes, but does not give a very good light. Because of its value as a fuel for smelting, iron and glass factories have been established in the natural gas regions in large numbers; but the extended use of the gas has led to such a diminution of pressure, that many of these factories have been obliged to resort to coal and coke for heating purposes. The gas has been pumped long distances and used in cities for fuel, but with its scarcity this use is being discontinued.

Natural History, in its widest sense, that department of knowledge which comprehends the sciences of zoölogy and botany, chemistry, natural philosophy or physics, geology, palaeontology and mineralogy. It is now, however, commonly used to denote collectively the sciences of botany and zoölogy, and it is sometimes restricted to denote the science of zoölogy alone.

Nat'uraliza'tion, the process whereby an alien is invested with the privileges and made liable to the obligations of a natural-born citizen. It implies the renunciation of one political status and the adoption of another. Formerly many states refused to recognize any act of naturalization as exempting the party naturalized from former allegiance. Thus the maxim of English common law, "Once an Englishman, always an Englishman," forbade a subject from adopting a new political status and rendered him liable to the penalties of treason, if found in arms against his native country. The existence of this principle gave rise to many disputes, more particularly between Great Britain and the United States, and it was not till the passage of the Naturalization Act of 1870, that her contention was formally abandoned by Britain. In the same year a treaty was entered into with the United States which provided that British subjects becoming naturalized in the United States should be treated in all respects as United States citizens, and *vice versa*.

Natural Selection

The requirements for naturalization vary in different countries. In the United States a foreigner must make a declaration on oath of his intention to become naturalized. This oath may be taken before any court of record having common law jurisdiction (See COURTS), and the applicant must renounce any title of nobility. After the lapse of at least two years from the date of this declaration, and after five years' residence in the United States, he becomes an American citizen, and a certificate of naturalization is issued to him. There is, however, no uniform system of registration of such certificates, and, as there are about 3000 Federal and state courts having power to grant them, great difficulties sometimes arise in proving naturalization.

In Great Britain naturalization is effected either through a special act of Parliament or under the Naturalization Act of 1870, which provides that any foreigner who has resided in the United Kingdom for five years or has for that period held service under the Crown, can obtain a certificate of naturalization, or citizenship, from one of the principal secretaries of state. In France a foreigner who has obtained permission to become domiciled in France is entitled to letters of declaration of naturalization after three years' residence. Also, by the French Naturalization Act of 1889, a foreigner who has resided in France for ten years may be naturalized without preliminary ceremony. In Germany, naturalization can be conferred only by the higher administrative authorities; the applicant must show that he is at liberty, under the laws of his native country, to change his nationality, or, if he is a minor, that his father or guardian has given him the requisite permission; that he is leading a respectable life; that he is domiciled in Germany, and that he has the means of livelihood.

In all countries a married woman is held to be a citizen of the state of which her husband is for the time being a subject, and the naturalization of a father carries with it that of his children in minority. In countries where military service is compulsory, naturalization in avoidance of this provision either is prohibited or renders the offender liable to imprisonment, if he returns, and forfeiture of all property subsequently acquired in his native country.

Natural Selection, a phrase frequently employed to indicate that process in nature by which those plants and animals best fitted for life under the conditions in which they are found, survive and spread, while others die out and

disappear. Allowing for slight variations, each pair of plants or animals tends to produce more than two like themselves, and hence in time they would fill any locality with individuals requiring the same food and environment. In time they would become very much crowded, and the weaker individuals would be driven out in the so-called "struggle for existence," thus illustrating again the "survival of the fittest." Of course, natural selection does not act suddenly, but operates noticeably only in a series of many generations. Moreover, it would not be possible were the individuals of each generation exactly like their predecessors. But children are never exactly like their parents; there are always variations which are intensified more or less by the surroundings. If natural selection acts at all, it is operative throughout the whole universe, from the lowest forms of animal life to man himself. Not all scientists accept this theory in all respects. See HEREDITY; EVOLUTION.

Natural Theology, that system of theology which treats of the existence and character of God as they may be learned from reason and nature. The fundamental idea of the system is that God is revealed through his works and may be known without the aid of supernatural revelation.

Nature Study. As the term is ordinarily used, *nature study* means the study, in common schools, of natural objects, such as plants, animals, minerals and the various forms of land and water. In institutions of higher grades, these studies constitute the various branches of natural science, as geology, physics, botany and zoology. This article is limited to nature study in the common schools.

PURPOSES. The purposes of nature study are:

(1) To train the child's powers of observation.

(2) To give him insight into the form, structure, characteristics and uses of all objects of nature, especially those belonging to the vegetable and animal kingdoms, with which he comes in daily contact.

(3) Through this acquaintance to lead the child to form a right attitude towards all objects which affect his life, to use all things economically, to prevent waste and destruction and to be kind to insects and animals.

(4) To lead the child to see the relations of various subjects to one another, as the relation of plant life to animal life and the dependence of occupations upon the geographical conditions of the locality in which he lives.

(5) To give the child the power to discover things for himself.

(6) To show the connection between the work of the school and the work of the home.

PLAN. With the exception of those children living in the congested portions of large cities, all children have some knowledge of the plant and animal life of their locality and of the different forms of water, as vapor, ice and snow; but their observation has not been systematic, and much of their knowledge is unclassified. The first work of the teacher is to train her pupils to habits of systematic observation. This may be accomplished by observing the following plan of procedure:

(1) With young children, especially those in the first and second grades, study objects as wholes. If the object is a pansy, use the entire plant.

(2) Question skilfully, so as to direct the pupil's attention to the facts in the order in which they should be learned, so as to enable him to see the relation of these facts to one another.

(3) Lead the pupil to discover for himself the facts which he should learn. He should not be told what he can learn from his own observation.

(4) Let each lesson depend as much as possible upon what has been learned in previous lessons.

(5) Secure from the pupils definite statements, in good English, of the facts they have learned.

(6) Lead the pupils to discover the uses of the objects studied.

(7) Keep the work within the capacity of the class. In the first three grades minute analysis of objects should not be attempted. Children in these grades easily grasp the relations of the large parts of an object, as the root, the stem, the leaves and the blossom of a plant, but they are not prepared for the study of the parts of these different organs. Besides, there is much more profitable work that they can do in these grades. The children of the third grade will enjoy studying attachments of seeds, by which they are scattered, and in spring, the germination of beans, peas, corn, squashes, pumpkins or other large seeds.

The plan outlined above for primary grades constitutes the foundation of work in more advanced grades. The teacher should adhere to the principles here set forth and elaborate upon the plan as the needs of the class require.

MATERIAL. In the selection of material the teacher should be guided by the locality the

season and the conditions of her class. She should select the material with a view to reaching a definite end through the nature study work. In the autumn the preparation of plants and animals for winter is a theme which affords many interesting lessons, such as the withering and falling of the leaves, the ripening of fruit, the scattering of seeds, the migration of birds, the storing up of food by some animals and the burrowing by others. During winter the study of frost, ice and snow and the weather will furnish many lessons of interest to the younger pupils, while the older ones may be interested in studying the bark, wood and plan of branching of the different trees common to the locality. In the spring, the awakening of life in the plant and animal kingdoms is of interest to all. In rural schools the study of the life history of insects injurious to vegetation and of means for preventing their ravages is an interesting and profitable line of work. The ingenious teacher will find means to use profitably the abundance of material at her disposal.

PREPARATION. The teacher should possess a good text-book on each of the following subjects: botany, zoology, physiology and physical geography, and she should have a work which describes the most common minerals. These can be obtained through any dealer and are inexpensive. Educational journals also contain much valuable material which will assist in nature study work. Many articles in this encyclopedia will be found helpful. See APPLE; GERMINATION; ROSE; BUTTERFLY; ROBIN; SILK-WORM, and other kindred topics. The teacher should also become familiar with the literature especially suited to nature study, and in connection with the study of plants and animals suitable poems and memory gems should be taught. See department of NATURE STUDY, Volume V.

There are scores of books on nature study, treating of both material and methods. Some of the best of these are Flag's *A Year Among the Trees*; Newell's *Outlines of Botany*—Part I, *From Seed to Leaf*; Part II, *Flower and Fruit*; Dana's *How to Know the Wild Flowers*; Arnold's *Waymarks for Teachers*; Hale's *Little Flower People*; McMurry's *Special Method in Natural Science*; Ballard's *Among the Moths and Butterflies*; Burroughs's *Birds, Bees and Bright Eyes*; Morley's *Insect Life*; Dugmore's *Bird Homes*; Flag's *A Year with Birds*; Lange's *How to Know One Hundred Wild Birds of Illinois* (the same author also has similar books for Indiana, Missouri, Minnesota and Wisconsin); Olive

Thorne Miller's *The First Book of Birds* and *The Second Book of Birds*. *Birds of Our City Parks* treats of the birds about Chicago, and other large cities have similar works for the birds of their respective localities.

Nature Worship, a crude form of religion, founded upon the belief that the objects of nature possess minds and wills and the power to help and to harm mankind. In such worship the object may be regarded as itself a divinity or as being the abode of a divinity.

Nau'gatuck, CONN., a town and borough in New Haven co., 17 mi. n. w. of New Haven, on the Naugatuck River and on the New York, New Haven & Hartford railroad. It has a memorial library, the Salem School, Sacred Heart Academy and a good high school, and it contains manufactories of India rubber goods, knit underwear, malleable iron and other articles. There is also a considerable trade in tobacco and other farm products. The place was incorporated as a town in 1844 and as a borough in 1893. Population in 1910, 12,722.

Naupak'tos. See LEPANTO.

Nausea, *naw'she a* or *naw'sha*, the sensation of sickness, or inclination to vomit, similar to that produced by the motion of a ship at sea. Though the feeling is referred to the stomach, it frequently originates in disorder of other and remote parts of the body, such as the brain or kidneys.

Nautical Almanac. See ALMANAC.

Nautilus, a genus of animals, related to the cuttlefish, possessing shells of many chambers. The shell of the pearly nautilus, an inhabitant of tropic seas, is a spiral with smooth sides; the turns, or whorls, lie one outside another and are separated into chambers by thin partitions. The animal always lives in the cavity of its outermost, or external, chambers, and the others, which have been its previous dwelling places, contain nothing. The chambers are connected by a tube, through which they may be filled with air or water, and thus the nautilus is able to rise or sink. The animal which has been said to sail its shell upon the surface of the water, is the *paper nautilus*, or argonaut.

Nauvoo', a town of Hancock co., Ill. See MORMONS.

Navaho or **Navajo**, *nah'va ho*, a tribe of indians numbering in 1900 about 20,000, many of whom are engaged in civilized pursuits. They occupy a reservation in the northwest of New Mexico and the northeast of Arizona. The women are skilled weavers and make fine

blankets; they also till their fields and tend their stock.

Na'val Acad'emy, UNITED STATES, a national school established at Annapolis, Md., in 1845, by special act of Congress, for the purpose of giving instruction to officers for the United States navy. The origin of the school is due to the historian George Bancroft, who, when secretary of the navy, urged the establishment of a school for training naval officers. The course of study covers six years, four of which are spent at the academy and two at sea. A cadet has the title of midshipman, and the graduates are given the rank of ensign. The course is very thorough and includes all branches necessary to make the graduates full-fledged seamen; a complete course for engineers prepares for marine, electrical and ordnance work. The graduates must be navigators and surveyors and have a good knowledge of English, French and Spanish. They are also required to become thoroughly conversant with the Constitution of the United States and with international law. From June to September the cadets are given practice and training on board ship, where they learn practical navigation. During the last two years they are trained in the duties of officers, and on account of the scarcity of officers in the navy within recent years, graduates have often been called upon to perform duties and assume responsibilities beyond what their commissions require. Two cadets are allowed for each senator, representative and delegate in Congress, two for the District of Columbia, five each year for the United States at large and one for Porto Rico, who must be a native of the island. This last appointment is made by the president, on recommendation of the governor of Porto Rico. The congressional appointments are made by the president through recommendations of senators and representatives, and those for the District of Columbia and the United States at large, by the president. Admission is by competitive examination. The administration of the academy is vested in a superintendent, who is a naval officer of high rank and is detailed to the duty by the secretary of war. The old buildings have recently been remodeled and new ones are being erected at an expense of \$8,000,000. The United States Naval Academy now ranks as the largest and best-equipped institution of the kind in the world. See NAVY, subhead *United States*.

Naval Observatory, *ob zurr'a to ry*, an astronomical observatory established at Washing-

ton, D. C., under the supervision of the bureau of equipment in the navy department. The buildings are on Georgetown Heights and comprise an office building and observatories for the various astronomical instruments used, chief among these being the 26-inch equatorial telescope, which was placed in position in 1874 and was at that time the largest instrument of its kind in the world. There are also transit instruments, astronomical clocks, photoheliographs and various other pieces of intricate apparatus. The library contains 20,000 volumes and a large number of pamphlets. The work of the observatory consists largely in following up discoveries that have been made in other observatories and making them practical. It also prepares the nautical almanac and issues numerous reports and articles pertaining to astronomical subjects. The United States Naval Observatory is one of the great institutions of its kind in the world and ranks with the observatories at Greenwich and Pultowa.

Naval Reserve, a force of men, in addition to the regular naval forces, who are trained and instructed in naval affairs, that they may be of service in time of war. In some countries during times of peace they are employed in the merchant marine and in life-saving service. In others they are given periodical seasons of training, being allowed to pursue other work in the intervals. The naval reserve of the United States consists of bodies of naval militia of the states, stationed at points on the sea coasts and on the Great Lakes, under the indirect control of the navy department, whose orders are executed by the governor and adjutant general of the state. In 1912 this force included 7320; 5372 were ranked as men, 1361 as petty officers, 558 as commissioned officers and 29 as warrant officers.

The naval reserve of Great Britain consists of about 45,000 men and officers, who are drilled on special drill ships or on vessels of the regular navy, assigned for the purpose. They are paid a small fee and are given regular pay during actual service. The same system in general obtains in France, Germany, Russia and Italy, though in several of these countries men who have completed a full term of naval service are also members of the reserve.

Naval Schools of Instruction, schools established for training the officers and men of a navy. Naval schools are maintained by all the leading nations, and in their general plan and requirements for admission they quite closely resemble one another, though they differ widely

in details and in the method of promotion after the students have left the schools. In the United States the naval schools of instruction consist of the United States Naval Academy, the Naval War College, the Naval Torpedo School, schools for training apprentices and gunnery training schools. The academy is at the head of the system (See NAVAL ACADEMY, UNITED STATES). The Naval War College is located at Newport, R. I.; it instructs officers in their regular duties and also in the preparing of plans for naval operations. The Naval Torpedo School is on Goat Island, Newport Harbor. The schools for training enlisted men are at Newport, San Francisco, Port Royal, S. C., and Lake Bluff, Ill. The courses in these training schools are elementary and do not prepare the men to become officers.

Navarre, *na vahr'*, a province and former kingdom of Spain, bounded by Aragon, old Castile, the Basque provinces and France. Its area is about 4055 square miles. Extensive forests clothe the slopes of the Pyrenees, which traverse the country, and the lowlands produce wheat, maize, wines, flax and hemp and afford abundant pasturage for cattle. Iron, copper and lead are among the minerals. The capital is Pamplona. The ancient kingdom of Navarre comprised both the modern province, sometimes called Upper Navarre, and also Lower Navarre, separated from the former by the Pyrenees and now included in the French Department of Basses-Pyrénées. Ferdinand the Catholic annexed Upper Navarre to Castile in 1512, while the northern portion passed with Henry IV to the crown of France.

Navarro, *na vah'ro*, MADAME. See ANDERSON, MARIE ANTOINETTE.

Nave, in Gothic architecture, the middle part of a church, extending from the western entrance to the transept or to the choir and chancel, according to the nature and extent of the church. It is usually flanked by one or two aisles, which are narrower and lower than the nave. According to the original meaning of the term, the nave is that part of the church which is farthest away from the sanctuary, namely, the so-called western part.

Navigation, the science of conducting ships or vessels from one place to another; more especially the art of directing and measuring the course of ships and of determining their position by observation and computation. The direct management of the sails, the rudder, the engines and the working of the ship generally, though

essential to navigation, are usually classed as seamanship. In order to navigate a ship successfully, it must not only be a perfect machine, but it must be supplied with accurate charts and plans of ports and harbors, with compasses, chronometer, sextant, log and the various mathematical instruments by which observations can be taken and computations made. It is by the compass that the direction which the ship sails or should sail is determined. Though the compass points in a northern direction, it does not always point to the true north, and its variation must be taken into account (See COMPASS; DECLINATION). The rate of speed at which a vessel is sailing is found by the log, which is heaved usually at the end of every hour (See LOG). The position of the ship may be obtained by noting the rate and direction of sailing and the distance which has been covered (See DEAD RECKONING). But the more accurate way is by taking observation of the heavenly bodies with the sextant and comparing these with data given in the *Nautical Almanac*, relying upon the correct Greenwich time, which is given by the chronometer. The science of trigonometry is involved in navigation, but the operations can be much shortened by tables and instruments. In directing a ship's course and applying it on a chart, several methods of what are called *sailings* are employed.

Navigation Acts, a name given to several acts passed by the British Parliament in 1645 and the years following, in order to protect British commerce, to injure the shipping interests of the Dutch and to exploit the British colonies. Parliament had enacted such laws as early as the reign of Richard II (1377-1399), but they had never been seriously enforced. The so-called First Navigation Act, passed in 1645, confirmed and enlarged in 1651 and again strengthened in 1660, enacted that all products of growth, production or manufacture from any country in the world should be imported into England only in ships built in England or in her colonies and manned by Englishmen. The so-called Second Navigation Act was passed in 1663; it levied prohibitive duties upon goods imported into the colonies from any but British ports and required that certain important products of the American colonies should be sent directly to England. A little later, duties were imposed upon goods shipped between colonies, if the same goods could be secured in England. Before the end of the century, acts directed at the suppression

of colonial manufactures were passed, and in 1719 Parliament condemned all colonial manufactures as "tending to independence." Before 1761 at least twenty-nine separate acts in restraint of colonial trade and manufactures had been passed, including one prohibiting the importation of molasses and sugar, from which the Americans manufactured rum for export. The full effect of this policy of suppression and exploitation was never felt in America, owing to the practice of smuggling, which was considered by the colonists as a legitimate business and which assumed immense proportions. Furthermore, many of the provisions of the acts were favorable to American industry, especially to shipbuilding, while certain privileges were extended to colonial producers which were denied to all others. However, the principle of restriction of trade and manufactures was vigorously denounced by the Americans, and the persistence of the British in this policy was one of the important causes of the Revolution.

Navigator's Islands. See SAMOA.

Navy, a collective term applied to the war ships of a nation, including also their crews, guns, engines and fittings (See MERCHANT MARINE). In olden times the commercial ships of a nation were safe only when protected by war vessels, and even now the great nations of the world find frequent occasions for the use of their war ships in protecting and advancing their commerce. The merchant marine and the navy of nations have in all times developed side by side—the merchant marine at the hands of individuals and corporations; the navy through the activities of the governments themselves.

For more than a century all nations have given special attention to the enlargement and improvement of their navies, and each has always been ready and willing to accept anything that will work improvement. With the invention of steamships and of heavy guns firing explosive shells, the wooden ships have been abandoned and new ships created (See ARMOR PLATE; CANNON; WAR SHIP). Every invention of modern days has been included, and the modern fighting ship uses every possibility of steam and electricity.

In the order of their importance the navies of the leading nations rank in 1914 as follows: Great Britain, first; Germany, second; United States, third; France, fourth; Japan, fifth; Russia, sixth; Italy, seventh; and Austria, eighth. Of the South American countries only

Brazil, Argentina and Chile, in the order named, have navies of any importance.

UNITED STATES. The American navy was begun in 1775, when Washington detailed some of his troops to blockade Boston Harbor against British vessels, and it gained some reputation during the Revolution by the combat between the *Bon Homme Richard*, under John Paul Jones, and the British ship *Serapis* (See JONES, JOHN PAUL). During the War of 1812 American seamanship won the admiration of the world, and the names of Perry, McDonough, Lawrence and others became household words in American homes.

The president of the United States is commander in chief of the United States navy, but he acts through the secretary of the navy, who is a member of his cabinet (See NAVY, DEPARTMENT OF). The maneuvers of fleets and the science of naval warfare are under the charge of a general board, which resembles somewhat the general staff of the army. Including the marine corps, there are about 37,000 men in the American navy, and over ninety per cent of them are Americans by birth or naturalization. The enlisted men are better treated than in most navies, and sometimes they are promoted to the ranks of commissioned officers. Commissioned officers are educated at government expense (See NAVAL ACADEMY, UNITED STATES), and there are other schools for enlisted men. Recently a school for the training of youths has been established by the government at Lake Bluff, Ill. The cost of the navy increases somewhat from year to year, and it already exceeds \$100,000,000 a year. The first important ships built after the reorganization of the navy in 1881 were the *Atlanta*, the *Boston* and the *Chicago*, which have since been remodeled as protected cruisers. The second-class battleships *Maine* and *Texas* were then built, and after them the battleships and armored cruisers which at Manila and Santiago in 1898 reestablished the reputation which the American navy had gained in the War of 1812. The number of ships in the navy is continually increasing under government appropriations. In 1913 the United States navy contained 33 first-class battleships, ranging from 10,000 to 26,000 tons displacement, and from 15 to 22 knots in speed, most of them carrying four 13-inch guns, all of them from four to ten 12-inch guns and large batteries of 6-, 8-, or 10-inch guns; 12 armored cruisers; 21 protected cruisers; 44 torpedo boat destroyers; 9 monitors; 26 tor-

pedo boats; 30 gunboats and the necessary transports, supply ships and colliers. A large number of river gunboats, training ships, tugs, naval yachts in use by the naval militia and a navy hospital should also be included in the naval list. There were two first-class battleships under construction and two more authorized. Navy yards are located at Brooklyn, N. Y.; Charleston, Mass.; Portsmouth, N. H.; Norfolk, Va.; Philadelphia, Pa.; Mare Island, near San Francisco; Washington, D. C., and Bremerton, near Seattle, Wash.

The navy is divided into a powerful North Atlantic fleet, made up of four squadrons; an Asiatic fleet of slightly inferior strength, also made up of three squadrons, and the smaller squadrons in the South Atlantic, at the European station and on the Pacific coast. The chief naval stations are at Brooklyn, Norfolk, Puget Sound and Mare Island (near San Francisco). Outlying stations in Porto Rico, the Philippines, Samoa, Hawaii and at Guam add greatly to the cruising power of the fleets. See SUBMARINE BOAT; TORPEDO; TORPEDO BOAT; TACTICS, subhead *Naval Tactics*.

GREAT BRITAIN. The British navy is directed by a board of six members, known as the lords of admiralty. The first lord is a member of the British cabinet, and one of the others is commander in chief of the navy. The various departments of construction, repair, training and supply are permanently in charge of expert officers. The enrollment of officers and men exceeds 130,000, besides 20,000 marine reserves in training, a force of naval reserves and a body of men in the merchant service to whom naval training is given. The government maintains a number of technical schools for the instruction of officers. In 1913 the navy included 67 battleships, most of which were first-class; 42 armored cruisers, 231 sea-going gunboats and army cruisers, 227 torpedo boat destroyers, over 50 torpedo boats, about 80 submarines, and a large supply of transports, hospital ships and repair ships. The entire fleet mounts over 2000 heavy guns and about 10,000 smaller cannon.

FRANCE. The head of the French navy is the minister of marine, who is responsible to the chamber of deputies and is assisted by an advisory council. In 1913 the navy contained 32 battleships, 14 coast defense ships, 23 armored cruisers, 83 sea-going gunboats and entire armored cruisers, over 80 torpedo boat destroyers, 173 torpedo boats and 90 submarine tor-

pedo boats. The fleets mount 800 heavy guns and 4500 smaller cannon.

GERMANY. The German emperor is at the head of the navy and is assisted by a cabinet of naval officers. In 1913 the navy included 39 battleships, 27 coast defense vessels and smaller battleships, 7 armored cruisers, about 50 smaller cruisers and gunboats, over 140 destroyers, 50 torpedo boats and about 30 submarines. The fleet mounted about 400 heavy cannon and 2000 smaller guns.

JAPAN. The Japanese navy is under the administration of the minister of marine and his cabinet. Notwithstanding the losses in the war with Russia, the navy came from the struggle with greatly increased tonnage and strength, due to captures and to the constant activity in shipbuilding. In 1913 it contained 22 battleships, several coast defense vessels, 9 armored cruisers, 30 gunboats and smaller cruisers, about 20 torpedo boat destroyers and nearly 100 torpedo boats and 15 submarines.

OTHER NATIONS. The Italian navy has 19 battleships and 7 armored cruisers. The Russian navy was reduced one-half during the Russo-Japanese War, but plans were immediately made for its rebuilding, on a larger scale than before. The Austrian navy contains about a dozen battleships of small size.

NAVY, DEPARTMENT OF THE, an executive department in charge of naval affairs of the United States government. At the head is the secretary of the navy, who is a member of the president's cabinet, and under him are various bureaus and officers. Among these are the chief of yards and docks, the chief of ordnance, the paymaster general, the surgeon general, the chief of construction, the chief of navigation, the judge-advocate general and the commandant of the marine corps. The chief of equipments has charge of the equipment and coaling of ships and the general supervision of the Naval Observatory, the *Nautical Almanac* and the hydrography bureau, which is concerned with the construction of sailing charts and maps. The chief of navigation has charge, among other things, of naval education (See NAVAL ACADEMY, UNITED STATES); the judge-advocate general supervises courts-martial, boards of inquiry and other legal affairs. The chiefs of bureaus serve four years and form a kind of advisory cabinet to the secretary. A bureau of fish and fisheries makes a constant study of marine life, in the interest of the fishing industry. See NAVY.

Naz'arenes, a designation given to the early Christians, from the town of Nazareth, where Christ dwelt. The name was also applied to a sect which arose at the end of the first century and existed chiefly in Egypt. They are supposed to have retained adherence to the Mosaic law and to have held a low opinion about the divinity of Christ.

Naz'areth, a small town in Palestine, 17 mi. s. e. of Acre, celebrated as the residence of Jesus during his youth. It is surrounded on all sides by hills. The houses are of stone, well built, with flat roofs, and the principal edifices are the conventual buildings of the Franciscan monks, which include the Latin Church of the Annunciation, supposed to mark the spot where the house of the Virgin Mary stood. The population is about 11,000.

Naz'arite, a term applied by the Jews to one who devoted himself in a special sense to the service of Jehovah. Among the ancient Jews there were Nazarites for life, and Nazarites for a limited period. The law of the Nazarites contained in *Numbers* vi, 1-21 applies to the latter class. The Nazarite was pledged to abstain from wine and to let his hair and beard grow during the fulfillment of his vow. Samuel and Samson were famous Old Testament characters who were Nazarites for life.

Nebo, MOUNT, a mountain of Palestine, situated east of the Dead Sea near its northern end. It was from the summit of this mountain that Moses viewed the Promised Land before his death (*Deut.* xxxii, 49; xxxiv, 1), and here he was buried. The mountain has been identified with the present Neba, and it probably took its name from a sanctuary of the god Nebo, a deity of the Babylonians and Assyrians. The altitude is 2643 feet.

N.ebraska, the TREE PLANTER STATE, one of the central western states, located near the geographical center of the Union. It is bounded on the n. by South Dakota, on the e. by Iowa and Missouri, on the s. by Kansas and Colorado, and on the w. by Colorado and Wyoming. Its length from east to west is 450 mi. and its width from north to south, 208 mi. The area is 77,520 sq. mi., of which 712 sq. mi. are water. Population in 1910, 1,192,214.

SURFACE AND DRAINAGE. Nebraska forms a section of the eastern slope of the great plains, and rises, at an average of about 10 feet to the mile, from an elevation of 850 feet, at the southeastern corner, to more than 5000 feet, on the western boundary, where the foothills of the

Rocky Mountains begin. The altitude exceeds 5300 feet at the highest point in the northwest part of Banner County. The average elevation of the state is about 2500 feet. The surface is rolling prairie through which rivers have worn wide and deep channels. Along the Missouri and the Platte are numerous high bluffs, and in the northwestern corner of the state is found a section of the Bad Lands, which occupy a larger area in South Dakota. These lands consist of bluffs that have been fantastically worn by wind and water into many curious and interesting shapes. They constitute one of the richest fossil regions of the world.

The state is drained directly or indirectly into the Missouri, which forms a part of the northern and all of the eastern boundary line. A height of land, extending irregularly from the eastern to the western boundary through the northern tier of counties, separates the streams that flow directly into the Missouri from those that flow into the Platte. The Niobrara, flowing eastward along the northern part of the state with its short, spring fed tributaries, forms one of the most picturesque regions of the continent; there are in its basin near Valentine 15 beautiful waterfalls, the highest of which are the Arikaree and the Parry, each with a precipice of 90 feet.

The Platte, formed by the North Platte, which enters the state near the middle point of the western boundary, and the South Platte, which enters it from Colorado, flows across the southern and central parts of the state to the Missouri. Its principal tributary from the north is the Loup, which receives the South Fork Loup, the Middle Loup and the North Fork Loup and drains a large portion of the central and southern part of the state. The Elkhorn enters the Platte from the north, a few miles before it reaches the Missouri. The Republican River flows through the southern tier of counties, from west to east, about three-fourths of the distance across the state, and then enters Arkansas, and the southeastern counties are drained by the Nemaha and tributaries flowing into the Missouri. A number of large and important lakes are found in Holt, Brown and Cherry counties.

CLIMATE. The climate is warm temperate and is characterized by the sudden changes common to inland regions. On the whole it is agreeable, exhilarating and healthful. The atmosphere is dry, and gentle winds prevail. The mean temperature is about $21\frac{1}{2}^{\circ}$ for January, and $74\frac{1}{2}^{\circ}$ for July, but the thermometer some-

times falls in winter as low as 25° below zero and rises as high as 100° during the hottest months. The nights, however, are invariably cool, and because of the dryness of the atmosphere the extremes of heat and cold are not felt as they are in a humid climate. The rainfall averages about 24 inches for the state, being over 30 inches in the eastern part and from 15 to 20 inches in the western counties. In respect to rainfall, the state is divided into three regions: the eastern, which receives an abundance of rain; the central, receiving usually enough for agriculture, and the western, which is semiarid.

MINERAL RESOURCES. The minerals are few, but valuable; building stone is found in most parts of the state, there being 200 limestone quarries in operation in 1910; a high-grade cement rock is generally distributed. Over 100 carloads of sand are daily shipped from the sand dredges. This sand is of superior quality, and much of it is used in the manufacture of artificial stone. In the south central counties there are also valuable deposits of ocher, and coal is found in the northeastern part of the state.

AGRICULTURE. With the exception of limited areas in the northwestern and western portions, the entire state is covered with a good soil, consisting of loam mixed with sand underlaid by a porous layer of sand or gravel. Corn is the leading crop and occupies nearly one-half of the acreage under cultivation. This is followed, in order of their importance, by wheat, oats and rye. Sugar beets are raised in large quantities, and Nebraska is becoming one of the important states in the production of beet sugar. Stock raising is practiced throughout the state, though it receives relatively greater attention in the western part, where the natural grasses mature and support live stock through the winter with little or no additional feed. Large numbers of horses and mules are raised for market, and cattle, hogs and sheep are fattened for slaughter. Dairy husbandry also is an important branch of agricultural industry.

MANUFACTURES. Nebraska is not a manufacturing state, though certain industries have received considerable attention. Chief among these is slaughtering and meat packing, the center of which is at South Omaha, which is the third city in importance in this industry in the Union. The second manufacturing industry of importance is the making of flour and other grist mill products. Large quantities of starch are made, and there are numerous factories for

canning fruits and vegetables and for the manufacture of beet sugar. The making of butter and cheese also receives considerable attention. Printing and publishing is an important industry, and the manufacture of cars and other railway appliances is being rapidly developed.

TRANSPORTATION AND COMMERCE. The state is well provided with railroad transportation facilities. In all, the state has about 10,000 miles of railways. Carriage roads are generally good. The Missouri is navigable, but the construction of railways has rendered it of little use as a waterway.

Nebraska exports large numbers of horses, cattle, sheep and hogs; also large quantities of dressed meat, flour and wool. It imports those manufactured products necessary to the needs of an agricultural population.

GOVERNMENT. The legislature consists of a senate of 33 members and a house of representatives of 100 members, each elected for two years. The legislature meets biennially, and the session is practically limited to sixty days. The executive department consists of a governor, a lieutenant governor, a secretary of state, an auditor, a treasurer, a superintendent of public instruction, an attorney-general and a commissioner of public lands and buildings, each elected for two years. The judicial department embraces a supreme court, district courts and county courts. The supreme court comprises seven judges, elected by popular vote for six years. The district courts are held in twenty-six districts, in each of which the judge is chosen for four years. County courts have probate and limited civil and criminal jurisdiction; the judges are elected for two years.

EDUCATION. The state maintains an efficient system of public schools, and its percentage of illiteracy is extremely low. The school fund is obtained from the interest on the money provided by the sales of public lands, from a state tax, from fines, from forfeitures and from local tax. The state university and agricultural college at Lincoln is at the head of the school system. There are four state normal schools, at Peru, at Kearney, at Chadron and at Wayne. The last two were authorized by an act of the legislature passed in 1909. Besides these, there are a number of important colleges and secondary schools supported by various denominations. Among these are Nebraska, Wesleyan University, Cotner University, University of Omaha and Bellevue, Doane, Grand Island, Hastings, Union and York Colleges.

INSTITUTIONS. The school for the deaf and dumb is at Omaha, that for the blind is at Nebraska City, and the institute for the feeble-minded is at Beatrice. The asylums for the insane are at Lincoln, Norfolk and Hastings. There are sailors' and soldiers' homes at Grand Island and Milford; also, a home for friendless children at Lincoln. The penal institutions consist of a state industrial school for boys at Kearney, a girls' industrial school at Geneva, an industrial home at Milford and a state penitentiary at Lincoln.

CITIES. The chief cities are Lincoln, the capital; Omaha, South Omaha, Fremont, Grand Island, Nebraska City, Beatrice and Hastings.

HISTORY. Nebraska was probably visited by Coronado as early as 1541, and in 1673 the Platte and Missouri districts were mapped out by Marquette. The present state formed a part of the Louisiana Purchase of 1803, and in 1804-1805 it was visited by Lewis and Clark. As early as 1825 white settlement was begun, the first towns being founded at Omaha and Nebraska City. After a long struggle, in which slavery played an important part (See KANSAS-NEBRASKA BILL), Nebraska was established as a territory in 1854, including parts of Dakota, Montana, Wyoming and Colorado. In 1863 it was reduced to its present limits. Nebraska became a state in 1867, and Lincoln was made the capital in the same year. The struggle for statehood was prolonged by differences between President Johnson and Congress over the state constitution. At the close of the Civil War negro suffrage was a prominent question and this entered into the Nebraska constitution. The 11th Territorial Legislature submitted a constitution to the people, and though it restricted the suffrage to white men, it was approved by the voters by a very small majority. The bill admitting the territory, which passed Congress in 1866, was vetoed by the President, but the next year a similar bill was passed over his veto. The state has had almost continuous prosperity, interrupted only by occasional Indian uprisings. Consult *Barrett's History and Government of Nebraska*.

Nebraska, UNIVERSITY OF. It comprises seven colleges: the graduate college, the college of arts and sciences, the teachers' college, the college of engineering, the college of agriculture, the college of law and the college of medicine. In addition to these the University embraces the schools of pharmacy, fine arts and music. The total enrollment is 4000 and the faculty numbers

400. The University library contains 100,000 volumes. The University has intrusted to its charge the United States Agricultural Experiment Station, the state museum, the botanical and geological surveys and the superintendency of farmers' institutes. All departments are open to both sexes on equal terms.

Nebraska City, NEB., the county-seat of Otoe co., on the Missouri River, about 40 mi. s. of Omaha, and on the Missouri Pacific and the Chicago, Burlington & Quincy railroads. The city is in an agricultural region which produces fine fruits, considerable corn and other grains. There are large stockyards, grain elevators, flour, lumber and planing mills, packing houses, foundries, plow works and other factories. A state institution for the blind is located here, and the city has a Federal building and a public library. It was settled on the site of old Fort Kearney in 1855 and was incorporated as a city in 1871. Population in 1910, 5488.

Nebraska River. See PLATTE.

Nebuchadnezzar, *neb'u kad nez'zur*, king of Babylon from 604 to 561 B. C., the son of Nabopolassar. After defeating Necho, king of Egypt, he subjugated Syria and Palestine, carrying off with him the sacred vessels of the Temple and the chief Jews into captivity. He destroyed Tyre in 585, and some years later he invaded and ravaged Egypt. During the peaceful years of his reign he rebuilt in a magnificent manner Babylon and many of the other cities of the Empire, and constructed vast temples, aqueducts and palaces, whose ruins still testify to his grandeur. Several inscriptions relating to his reign have recently been found.

Neb'ula (plural, *nebulae*), a white cloud-like patch of light seen in the heavens, always in the same position. Two nebulae are visible to the naked eye, the one in Orion being the larger. Many others are visible through the telescope, and about ten thousand are now known. A large number of these are known to be clusters of stars. On the other hand, the spectroscope has shown that many nebulae, among which are several that had hitherto appeared to be well authenticated clusters, consist, in part at least, of masses of incandescent gas. The recent researches of Mr. Norman Lockyer render it probable that nebulae include clouds of meteors, which, by their continual impact against one another, produce the heat, light and gaseous matter that are detected by our telescopes and spectroscopes. It may be that here are new

systems in process of formation. See NEBULAR HYPOTHESIS.

Nebular Hypoth'esis, a theory advanced by Laplace to account for the formation of our solar system. The theory supposes that the bodies composing the solar system once existed in the form of a nebula; that this had a revolution on its own axis, from west to east; that, the temperature gradually diminishing, the nebula contracted, the rotation increased in rapidity and zones of nebular matter were successively thrown off, in consequence of the centrifugal force overpowering the central attraction. These zones, being condensed, and partaking of the primary rotation, constituted the planets, some of which in turn threw off zones, which now form their satellites. In this way the earth was thrown off from the sun, and the moon from the earth. Jupiter has thrown off seven such, and in its rings Saturn may show a satellite in process of formation. Though still open to certain objections, the nebular hypothesis is now generally received by astronomers.

Necho, *ne'ko*, or **Neku**, a king of Egypt, mentioned in *II Kings* XXIII, 29, and *Jeremiah* XLVI, 2. He belonged to the twenty-sixth dynasty, succeeded his father, Psammeticus I, and reigned from 610 to 594 B. C. He extended his dominions from the south of Syria to the Euphrates, defeated Josiah, king of Judah, at Megiddo, but was ultimately driven back by Nebuchadnezzar.

Necker, *na kair'*, JACQUES (1732-1804), a French minister of finance. He became clerk in a Paris banking house in 1750 and afterward accumulated a large fortune as a banker. In 1777 he was made director-general of finances. Official corruption under the preceding reign had caused a large deficit, to which the American war made great additions. Necker endeavored to meet the exigency by loans and reforms, and above all, to fund the French debt and establish annuities under the guarantee of the State. His suppression of abuses had created him many enemies at court and, shortly after the publication of his famous account of the conditions of the treasury, he resigned and retired to Switzerland. The errors of Calonne, who next had the management of the State finances, increased Necker's reputation, and in 1788 he was recalled. In 1789 the advisers of the king succeeded in inducing him to give Necker his dismissal, and to order him to leave the kingdom. No sooner was his removal known than all Paris was in a ferment. The storming of the

Bastille followed, and the king found himself compelled to recall the banished minister. Necker's return to Paris resembled a triumphal procession. His first object was to restore tranquillity and security of person and property. But he was not equal to the political, or even the financial, crisis, and he resigned in September, 1790. Necker's daughter was the well-known Madame de Staël. See STAËL-HOLSTEIN, ANNE LOUISE GERMAINE.

Necromancy, *nek'ro man sy*; (sometimes called the Black Art), the art of ascertaining the future by questioning the dead. Necromancy originated in the East and is one of the most ancient superstitions. It was practiced by the Greeks, and the works of Homer and other early Greek writers contain frequent references to it. It is also mentioned in the Old Testament, where it is severely censured. Necromancy was practiced by the nations of northern Europe during the Middle Ages, and later it was united with sorcery. See SPIRITUALISM.

Necrop'olis, a name originally applied to a suburb of Alexandria devoted to the reception of the dead and hence extended to the cemeteries of the ancients generally. The name has also been given to some modern cemeteries in or near towns.

Nectar, *nek'tur*, in Greek mythology, the drink of the gods, one of the means by which they retained their eternal youth. See AMBROSIA.

Nectarine, *nek'tur in*, a fruit which differs from the peach only in having a smoother rind and firmer pulp, being indeed a mere variety of peach.

Needle, a small instrument of steel, pointed at one end and having, at the other, an eye, or hole, through which is passed a thread. The needle is used for sewing. The earliest needles were made of bone, ivory, wood and bronze. The first steel needles were made in Nuremberg, in the latter part of the fourteenth century, and until the last half of the nineteenth century needles were made almost wholly by hand.

The principal steps in making needles are as follows: The wire, which comes to the manufacturer in coils, is cut into pieces of the length of two needles, called *blanks*. The blanks are then straightened by being rolled on a stone or iron table, after which they are pointed by being fastened to a rubber band, so arranged as to give them a rolling motion while the ends are brought against a rapidly revolving grindstone. From fifty to sixty needles can be pointed

at once. After pointing, the blanks pass to a machine which slightly flattens them in the middle and marks the places for the eyes. A second machine punches the eyes, and the needles are then strung on two wires, one through each set of eyes. After stringing, they are cut apart between the eyes, leaving each wire with a set of needles strung upon it. The heads and eyes are then finished, and the needles are tempered, polished, sorted and placed in packages for the market. Notwithstanding all of the machines now used in the manufacture of a needle, it passes through the hands of seventy workmen before the process is completed. England is the leading country in the manufacture of needles, and those of the best quality are made there. Most of the needles used in the United States are of English make.

Needles for knitting, crocheting, jacquard loom weaving, sewing machines and various other purposes have their size and form adapted to the use for which they are constructed.

Needle Ore or **Bismuth Glance**, a native sulphide of bismuth, lead and copper, occurring imbedded in quartz, in long, thin, steel-gray crystals, marked with vertical lines and apparently in four or six-sided prisms. It usually accompanies native gold.

Nee'nah, Wis., a city in Winnebago co., 14 mi. n. of Oshkosh, on Lake Winnebago, at its outlet into the Fox River, and on the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul, the Wisconsin Central and other railroads. It forms with Menasha practically one industrial center. The river furnishes good water power, and the manufactures are stoves, flour, paper, lumber and other articles. It contains several public parks and is an attractive summer resort. The place was settled in 1846, was incorporated in 1850 and was chartered as a city in 1873. Population in 1910, 5734

Negative Quantity, a term applied to quantities opposite in character to others which are arbitrarily termed positive. For instance, if credit is positive, debt is negative; if distance to the right is positive, distance to the left is negative; if a body at a high potential of electricity is positively electrified, one at a low potential is negatively electrified. The sign + before the expression of a quantity indicates that that quantity is positive. The sign — indicates that it is negative. In mathematics the conception of a negative quantity is necessitated by the frequent occurrence of such expressions as 4 — 6. This, when read "Take six units from

four units," expresses an impossible operation. When read, "Find the number which, added to six, will give four," it also expresses an impossible operation, if only positive numbers be considered. But we may conceive of numbers opposite in character from positive numbers, so that when added to a given number they cause it to diminish rather than increase. These numbers are called negative. Thus, mathematicians find it necessary to imagine a whole series of numbers beginning at zero and proceeding, in the opposite direction from positive numbers, to infinity. See ALGEBRA; IMAGINARY QUANTITY; NUMBER.

Negau'nee, MICH., a city in Marquette co., 3 mi. e. of Ishpeming, on the Chicago & Northwestern, the Duluth, South Shore & Atlantic and other railroads. It is in the iron-producing region of the state, on a high ridge known as Iron Mountain. Iron mining and shipping is the principal industry, and lumbering is also carried on. The place was settled in 1870 and was incorporated three years later. Population in 1910, 8460.

Negligence, *neg'li jens*, in law, the omission to do that which ought to be done. When such want of care results in injury to another or when it involves a wrong done to society, it renders the guilty party liable either to an action for damages or to trial for misdemeanor. In law there are recognized three degrees of negligence; *ordinary*, the want of ordinary care or diligence; *slight*, the want of great care or diligence, and *gross*, the want of slight care or diligence. An alleged act of negligence must always be the proximate cause of the injury sustained; but any injury caused to a person by another who at the time is exercising due care is not actionable. The question of negligence is usually one for a jury, and the burden of proof rests on the plaintiff, except when the thing resulting from the negligence speaks for itself. A master is responsible for the negligence of his servants. In no case can redress be had where the plaintiff is shown to have been guilty of contributory negligence. So, if a person, in crossing a track, were struck and injured by a train, he would not be able to collect damages if it were shown that he had not taken due care in crossing, even if the train crew were also negligent.

Negotiable, *ne go'she a b'l*, **In'struments**, written contracts which can be transferred. A distinction is made between *negotiable* instruments and *assignable* instruments. The former are enforceable by the transferee in his own

right, without the risk of being met by any defense that would have held good against the transferrer. The latter gives to the transferee only such rights as the transferrer held. The most common forms of negotiable instruments are bills of exchange, promissory notes and checks, the common characteristic of these instruments being that they are security for, and are representative of, money. However, these instruments are negotiable only when payable to the order of a certain person or to bearer, or when endorsed by the person to whom they are payable. See PROMISSORY NOTE.

Negotiable Paper. See NEGOTIABLE INSTRUMENTS.

Negritos, *na gre'toze*, or **Negrillos**, the name given to several negro-like races inhabiting the East Indies, often confounded with the Malay race. They are dwarfish in stature, averaging from four feet six inches to four feet eight inches in height. The nose is small, flattened or turned up at the tip, and the hair is soft and frizzled. The various tribes speak distinct and mutually unintelligible dialects.

Negro, EDUCATION OF THE. Previous to the Civil War, there were practically no attempts to educate the negroes in the United States. In some of the slave states, teaching a slave or a free colored person to read and write was made a crime punishable by fine and imprisonment. During the Civil War a large number of colored men entered the Union army, and many of these were taught to read and write before they were discharged from the service. But the number was so small, compared with the entire colored population, and their education was so limited, that the influence of this work was not far-reaching.

The abolition of slavery made the education of the negro a national problem. The first movements toward this education were by the church societies of the Northern states, and under the influence of one of these, the Hampton Institute was established in 1861 (See HAMPTON NORMAL AND AGRICULTURAL INSTITUTE). Under the direction of these societies, thousands of young men and women from the Northern states entered the South and engaged in teaching the colored children and youth. The government early began the work in the establishment of the Freedmen's Bureau, which was organized in 1865 (See FREEDMEN'S BUREAU). During the five years of its existence, this bureau devoted a large part of its energy and income to the establishment of common and

secondary schools for negroes. Several wealthy men also contributed large sums, the income of which was to be applied to education in the former slave states (See PEABODY EDUCATIONAL FUND; SLATER FUND).

The combined efforts of all these agencies succeeded in placing the movement for educating the negroes on a sure foundation between 1865 and 1870. At an early date it was seen that much better results could be accomplished if people of the colored race were trained to teach in colored schools, and between 1868 and 1878 a number of normal schools and colleges were established, the greater part of whose work was to train teachers. As fast as the Southern states were reorganized, school systems patterned after those in the North were instituted, and in these provision was made for separate schools for white and colored children.

But notwithstanding all these efforts, the education of negroes has been attended with many difficulties. Foremost among these has been lack of adequate support from public funds. The slaveholding states were financially and industrially ruined by war, and for several years it was well-nigh impossible to obtain public funds for any purpose. Another serious obstacle at first was the opposition of the white people of the South to the education of the negro. It was not unnatural that a population which, for more than 200 years, had considered the education of the negro a crime, should look upon it after the slaves were freed as nothing less than a calamity. However, this opposition gradually grew less as the results of education were seen. Another obstacle to progress was in the mistakes made by the early teachers in these schools. It was natural that they should attempt to establish in the colored schools the systems of instruction to which they had been accustomed in the North. They failed to realize what has since been learned by experience—that the negro needed industrial education more than he needed literary training. In many of these early schools too much attention was given to literary culture, particularly to the study of Latin and Greek and other higher branches, to the neglect of training for the more common affairs of life.

Happily these obstacles have been gradually removed. Men prominent in business and national affairs, both North and South, have banded themselves together, under the General Educational Board and the Southern Educational Board, for the purpose of lending their influence

and means to the furtherance of this work. Free public schools for colored children now exist in all the Southern states. The influence of the higher institutions of learning has been of great value, especially such institutions as Fisk University at Nashville, Howe University, Atlanta University and the normal and industrial schools at Hampton and Tuskegee. The influence of the educated colored people who have gone from these schools is beyond measure. They establish in their own localities cultured homes; they engage in business or follow a trade or profession successfully, and in many places they establish industrial schools similar to those from which they graduated. See **TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE**; **WASHINGTON, BOOKER TALIAFERRO**.

Negro Race or Black Race. See **RACES OF MEN**.

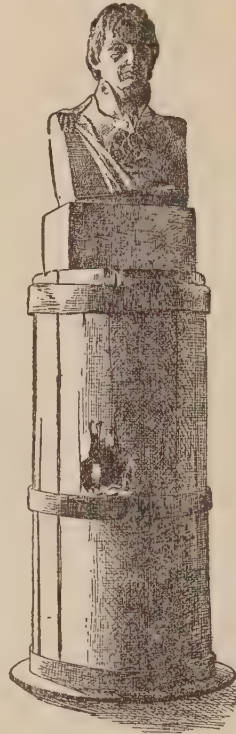
Negros, *na'grohs*, an island of the Philippines.

Ne'hemi'ah, a distinguished and pious Jew, born in captivity, who was made the cup-bearer of Artaxerxes, king of Persia. He was sent (444 B. C.) as governor to Jerusalem, with a commission to rebuild the walls and gates of that city. He accomplished his purpose, but not without difficulties, arising partly from the poverty of the lower classes and partly from the opposition of the Ammonites and other foreign settlers. The book of *Nehemiah* contains the account of his proceedings.

Nel'son, a town of British Columbia, on the Kootenay River, 20 mi. w. of Kootenay Lake. It is on the Canadian Pacific, the Spokane Falls & Northern and the Nelson & Fort Sheppard railways. It is the center of the mining industry of the region and has smelters and a foundry. Population in 1911, 4476.

Nelson, **HORATIO**, Viscount (1758-1805), a great British admiral. At the age of twelve he entered the navy as a midshipman, and he received rapid promotion. On the outbreak of the war with the French Republic, he was made commander of the *Agamemnon*, of sixty-four guns, with which he joined Lord Hood in the Mediterranean. He assisted at the siege of Bastia and at Calvi, losing his right eye in the latter engagement. For his gallantry at the Battle of Cape Saint Vincent he was made rear admiral and was appointed to the command of the inner squadron at the blockade of Cadiz. His next service was an attack on the town of Santa Cruz, in the island of Teneriffe, which proved unsuccessful. In 1798 he was sent to the Mediterranean; he followed Napoleon to Egypt, and in the Battle of Aboukir Bay destroyed

the French fleet. For disobedience to orders sent to him in July, 1799, Nelson was recalled, but in 1801 he was employed on the expedition to Copenhagen, in which he effected the destruction of the Danish ships and batteries.



HORATIO NELSON
and part of the flagstaff of
the *Victory*, in London

which the British were completely victorious, but their commander was wounded in the back by a musket ball and died soon afterward. His remains were carried to England and interred in Saint Paul's Cathedral.

Nelson River, a river of Canada, which issues from Lake Winnipeg and after a winding course of about 400 miles falls into Hudson Bay. Numerous rapids and falls retard navigation, but the river is navigable for about 80 miles from its mouth.

Nel'sonville, **OHIO**, a city in Athens co., 62 mi. s. e. of Columbus, on the Hocking River and on the Hocking Valley railroad. It is in one of the most productive coal fields of the state and contains manufactures of mining implements, car wheels and other articles. The waterworks are owned by the city. Population in 1910, 6082.

Nelum'bo, a genus of plants living in the fresh waters of the temperate parts of the world.

When hostilities recommenced after the Peace of Amiens, Nelson was appointed to command the fleet in the Mediterranean, and for nearly two years he was engaged in the blockade of Toulon. In spite of his vigilance, the French fleet got out of port, was joined by a Spanish squadron from Cadiz and sailed to the West Indies. The British admiral hastily pursued them, and they returned to Europe and took shelter at Cadiz. On October 19, the French, commanded by Ville-neuve, ventured again from Cadiz, and on the twenty-first they came up with the British squadron off Cape Trafalgar. An engagement took place in

distinguished by large, handsome flowers with numerous stamens. The best-known species is the Hindu and Chinese lotus, a magnificent flower which grows freely in the rivers and ditches of all the warmer parts of Asia, Australia and northern Africa. The canals of China are filled with it, and there its tubers are used as a



NELUMBO
Showing seeds and enlarged receptacle

vegetable. In the United States it is frequently cultivated in hothouses or in the ponds of parks and gardens where it can be protected sufficiently from the cold. A species of *nelumbo*, commonly called the *lotus*, or *water chinquapin*, is a native of the southern part of the United States and of certain localities in the North. It has large, yellow flowers and bears tubers which are used for food. The seeds, which are sunk in the large, fleshy, top-shaped receptacle, are also edible.

Nemean, *ne'me an*, **Games**, ancient Greek games, held in the valley of Nemea, in Argolis, where Hercules is said to have killed the Nemean lion. They recurred ordinarily every second year and were similar in character to the other Greek games. Eleven of Pindar's odes are in celebration of victors at the Nemean games.

Nem'esis, in classical mythology, the goddess of fate. She was not regarded as resembling the three fates, but represented rather the power which brought to every man his just deserts.

Neocene, *ne'o seen*, **Epoch**, a division of geologic time, used by the United States Geological Survey and including the middle portion of the Cenozoic era. It takes the place of the Miocene and Pliocene epochs of European geologists. See GEOLOGY; TERTIARY PERIOD.

Nepal or **Nepaul**, *ne paw'l*, an independent state of India, in the Himalayas, north of Bengal. Its area is approximately 54,000 square miles. It contains within its boundaries some of the highest mountains in the world—Mounts Everest (29,002 feet), Dhawalaghiri (26,826) and Kunchinjunga (28,156). Although the territory is for the most part broken up by mountain ranges and narrow valleys, there are some fertile, cultivated tracts, and rice, wheat, barley, maize, sugar cane, buckwheat, tea, cotton and tobacco

are produced. Pasturage is, on the whole, scarce and indifferent. The sheep and goats, however, have fine wool. The manufactures of Nepal include coarse cotton cloth, metallic goods, paper and pottery. Population, estimated at from 3,000,000 to 4,000,000. The territory of Nepal came into the hands of the Gurkhas in the eighteenth century. In 1814 and 1815 a war occurred between the Gurkhas and the British, and although the victories were not all with the British, they managed to force the Gurkhas to permit the establishment of a British residency at their capital.

Nephelin, *ne'fe lin*, or **Nephelite**, *ne'fe-lite*, a mineral found mixed with other substances in volcanic rocks, in small masses or veins and in six-sided crystals. It is usually white or yellow.

Nephrite, *ne'frite*, a mineral of a leek-green color, massive and in rolled pieces, remarkable for its hardness and tenacity. It was formerly worn as a remedy for diseases of the kidneys. From this circumstance it received its name, which is derived from a Greek word meaning *kidney*. It is now considered the same as jade. See JADE.

Nep'igon. See NIPIGON.

Nep'issing. See NIPISSING.

Ne'pos, CORNELIUS, a Roman author of the first century B. C., the contemporary of Cicero and Catullus. The only extant work attributed to him is a collection of short biographies. These biographies were long a favorite textbook, on account of the pureness of their language, and they have been issued in many editions.

Nep'tune, in classical mythology, the god of the sea, known to the Greeks as Poseidon. He was a son of Saturn and Rhea and a brother of Jupiter and Pluto and was regarded as inferior in power to Jupiter only. Neptune was not entirely satisfied with his share of the universe and attempted at one time to take Jupiter's kingdom from him, in punishment for which attempt Jupiter condemned him to serve for a time Laomedon of Troy. Laomedon set him to building the walls of the city, and in this he was assisted by Apollo. The treacherous Trojan king, however, refused to pay to the gods the rewards which he had promised, and Neptune, to punish him, created a great sea monster, to which a beautiful girl was sacrificed each year. This punishment continued until the monster was finally killed by Hercules. Neptune also attempted to acquire the supreme power over the city of Athens, and for this

purpose he entered into a contest with Minerva, agreeing that the city should be named for the one who created the most useful gift. Minerva created the olive tree, and this was regarded as of greater benefit to mankind than the horse, Neptune's gift, and the city was accordingly named *Athens*, from Minerva's Greek name, *Athene*. Neptune was represented as a man of middle age, somewhat resembling Jupiter, but with less of dignity and kindliness in his aspect. He rode about over the surface of the sea in a chariot drawn by sea horses, and waves were stilled at his approach.

Neptune, the eighth planet from the sun and, so far as yet known, the outermost of the solar system, its mean distance from the sun being more than 2,600,000,000 miles. It is about 35,000 miles in diameter and about one and three-fifths times as far from the sun as Uranus, which is next nearer. Neptune is wholly invisible to the naked eye, and it is difficult to find and study through the telescope. It was discovered in 1846 in a position which had been indicated independently by two different astronomers. Many had searched for it, and it was at last found at the exact point where it must be to produce the otherwise unaccountable motions that had been observed in Uranus. This is regarded as one of the great triumphs of astronomy. Soon afterwards it was discovered that Neptune has one moon, moving about it from east to west. Through the telescope the planet is so faint and far away that little can be learned about it, and it appears only as a faint body of bluish tint. See **PLANET**.

Nerbud'da or **Narbada**, a river of India which rises in Gondwana, flows in a general west-southwest direction and empties into the Gulf of Cambay. Its total length is about 750 miles. In religious sanctity this river ranks second only to the Ganges.

Nereids, *ne're idz*, in classical mythology, sea nymphs, daughters of Nereus and Doris and constant attendants on Neptune. According to some accounts they were human in form; according to others, they had the tail of a fish. They were usually represented as riding about on horses.

Ne'reus, in classical mythology, the father of the Nereids, an inferior divinity of the sea and a god subordinate to Neptune. By the ancient artists and poets he was represented as an old man, wreathed in sedge, seated upon the waves.

Nero (37-68), a Roman emperor, the son of Cneius Domitius Ahenobarbus and of Agrippina,

the daughter of Germanicus. When Nero was about seventeen years of age his mother poisoned her husband, Claudius, and succeeded in securing the throne for her son, over whom she expected to exercise the most absolute control. In the year after his accession Nero disposed of the rightful heir, Britannicus, by poison. For the first few years his public conduct, under the control of Seneca, was unexceptionable; in private, however, he disgraced himself by the most odious vices, and his mother endeavored to retain her influence by shamefully complying with his inclinations. In 59 Nero caused his mother to be murdered, and then, fearing no rival in power, he gave full scope to the darkest traits of his character. In 64 occurred the burning of Rome, which was charged upon Nero, who, however, accused the Christians of the act and made it an excuse for the most dreadful cruelties toward them. His debaucheries and cruelties occasioned an almost general conspiracy against him, the discovery of which led to more tortures and bloodshed. The revolt of Vindex was also suppressed, but that of Galba succeeded, and Nero escaped arrest by stabbing himself. He was a lover of arts and letters and possessed much taste as a poet.



NERO

Nerva, *nur'va*, (32-98), a Roman emperor, one of the most virtuous of the emperors. He was twice consul and was elected emperor on the death of Domitian, in 96. He adopted Trajan, who succeeded him.

Nerves, *nurvz*, the bundles of sensitive fibers which carry impulses and sensations between the nerve centers and other parts of the body. Each of these nerves consists of several smaller bundles of fibers, each of which is clothed with a protecting tissue, and each complete nerve has also a special sheath of tissue. The whole is somewhat elastic, and its color is a grayish-white. For the distribution and functions of nerves, see **NERVOUS SYSTEM**; **ANATOMY**.

Nervous Diseases, diseases due either to actual changes in the structure of nerve fibers or nerve centers, or to some irregularity of nerve function, without actual structural change. Nervous diseases may arise from such causes as inflammation or degeneration of nerve substance; the pressure on some part of the nervous system of tumors, effused blood or other fluid; the death of some part, by the cutting

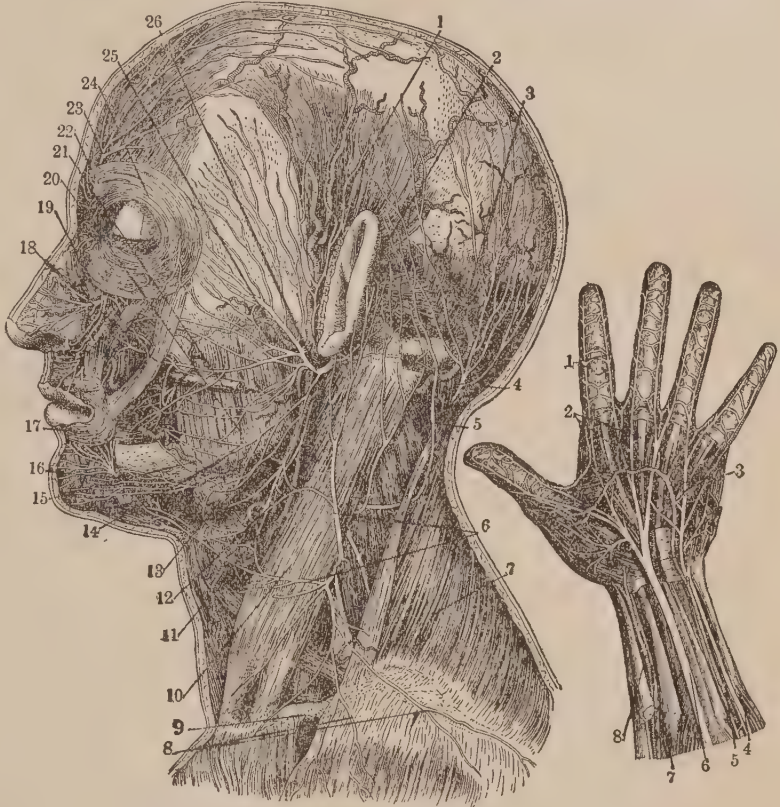
off of its blood supply, or the lowered nervous action which comes as a result of general bad health. See articles on APOPLEXY; EPILEPSY; LOCOMOTOR ATAXIA; NEURALGIA; SAINT VITUS'S DANCE, and other nervous diseases.

Nervous System, that part of animal bodies which includes the nerve centers and their connecting nerves. The human nervous system is divided into cerebro-spinal and sympathetic systems and is more complex and more highly developed than that of any of the lower animals.

CEREBRO-SPINAL SYSTEM. This division of the nervous system includes the brain, the spinal cord and nerves branching off from them. For a description of the brain, see BRAIN.

The *spinal cord* is a mass of nerve matter filling the canal of the spinal column and extending from the medulla oblongata to the first lumbar vertebra. It is about 18 inches long and is divided by deep fissures into right and left halves, each of which consists of anterior, lateral and posterior columns. The outside of the cord is composed of white nerve fibers, and the inside consists of gray matter, forming an irregular mass whose vertical structure somewhat resembles the letter *H*. In the center of the cord is a canal, which connects at its upper extremity with the ventricles of the brain. At the lower extremity the spinal cord divides into a number of nerve trunks, some of which continue downward within the spinal column to

the sacrum. In the lower part of the neck there are also enlargements, from which nerves branch off to the arms, and in the lumbar regions are similar enlargements, from which branch the nerves to the lower extremities. Between these points the spinal nerves branch off in pairs upon each side of the cord and pass out of the spinal



SUPERFICIAL ARTERIES AND NERVES OF THE FACE AND NECK

1, Temporal artery; 2, artery behind the ear; 3, occipital artery; 4, greater occipital nerve; 5, smaller occipital nerve; 6, nerve of the neck; 7, trapezius muscle; 8, clavicular nerves; 9, clavicle; 10, sterno-cleido-mastoid muscle; 11, outer artery of the head; 12, inner artery of the head; 13, salivary gland; 14, nerves of the lower jaw; 15, outer maxillary artery; 16, nerve of the chin; 17, circular muscle of the mouth; 18, greater yoke muscle; 19, nerves below the eye; 20, masseter, or chewing muscle; 21, ear passage; 22, arteries of the forehead; 23, nerves of the forehead; 24, eye-closing muscle; 25, facial artery; 26, facial nerve.

NERVES OF THE HAND

1, Nerves of the skin; 2, tendons; 3, arteries of the palm of the hand; 4, elbow nerve; 5, elbow artery; 6, nerve of the forearm; 7, nerve of the under-arm; 8, artery of the under-arm.

consists of gray matter, forming an irregular mass whose vertical structure somewhat resembles the letter *H*. In the center of the cord is a canal, which connects at its upper extremity with the ventricles of the brain. At the lower extremity the spinal cord divides into a number of nerve trunks, some of which continue downward within the spinal column to

column through the openings between the vertebrae. In all, there are 31 pairs of these nerves, each pair consisting of two sets of nerve fibers—sensory and motor.

The sensory, or *afferent*, nerves originate in the posterior column of the spinal cord, and before joining the motor nerve the fibers form a ganglion (See GANGLION). These are the

nerves of feeling, which transmit impressions from without through the spinal cord to the brain centers. The motor, or *efferent*, nerves originate in the anterior column of the spinal cord, but do not form a ganglion before joining the sensory nerve. The sensory and motor nerves meet and constitute a pair as they emerge from the spinal canal and run side by side to their extremities. Wherever one divides, the other makes a similar division, until in their final subdivisions they become so small that the fibers cannot be distinguished. Motor nerves are nerves of motion and convey impulses from the nerve centers outward.

These nerves look like white cords and are called nerve trunks when they branch from the spinal cord. Each one consists of a central axis of gray matter, usually known as the *band axis*, enclosed in a sheet of white, fibrous nerve tissue. The nerves then interweave and form networks, or plexuses, of nerve fibers, and in their last divisions they constitute a complete network in the skin, where the sensory nerves are so numerous that a prick from the finest needle anywhere on the surface of the body injures one or more of them, and the pain arising from the wound makes the person conscious of the injury.

THE SYMPATHETIC SYSTEM. This system consists of a series of ganglia, extending from the head through the neck, thorax and abdomen to the pelvis. In the thoracic and abdominal cavities the ganglia are arranged in pairs on either side of the spinal column and terminate in a single ganglion in the pelvis. The sympathetic nerve centers of the head distribute nerve fibers to the muscles which control the pupil of the eye (See EYE) and to the palate and glands about the mouth. The thoracic ganglia are twelve in number and are all connected by a sympathetic cord. They also communicate with the cerebro-spinal nerves. Nerves from these ganglia pass to the different abdominal organs and control the action of the glands whose functions are concerned with digestion and excretion. The two principal ganglia of the abdominal cavity are the largest in the system, and the branches from these unite to form the *solar plexus*, which is situated directly back of the stomach. This ganglion sends nerves to various abdominal plexuses and also to the blood vessels that follow the intestines and the other abdominal organs. These ganglia are also connected with each other by a sympathetic cord and by spinal nerves with the cerebro-spinal system.

In structure and general appearance the sympathetic nerves resemble those of the cerebro-spinal system. They are less sensitive and slower to act than the cerebro-spinal nerves, and they preside over the vital functions—circulation, digestion, secretion and excretion.

PHYSIOLOGY. The functions of the nervous system are to coördinate the movements of the body and to bring to the centers of intelligence and action communications from the outside world. The nerves of the cerebro-spinal system are arranged in pairs. One nerve of each pair, the sensory, carries impressions from without to the brain, and the other, the motor, carries them from the brain and other nerve centers outward. A nerve can be aroused to action artificially by any of the following means: Mechanical action, such as touching, striking or pinching; a change of temperature, provided it is sudden, as when the hand is brought in contact with a hot or cold object; chemical action, such as that of a strong acid or alkali; electricity. The stimulus arising from any of these agencies is caused by the suddenness of action. A slow rise or fall in temperature will not give rise to a nerve impulse. There are also many stimuli to action from within the body, which are recognized by their outward manifestations, such as the movements arising from the decision to perform a certain act, as throwing a ball or writing a letter. There are other sets of stimuli that act upon special nerves, such as the optic, auditory and olfactory. See SENSES, SPECIAL.

The nature of nerve impulse is not well understood, but it is known to be wavelike in its movements, and it traverses the nerves at the rate of about 100 feet per second. All impulses belong to one of two classes, those that produce feeling and those that produce motion. Both kinds traverse the nerves in both directions. Each kind originates in the class of nerves to which it belongs; motor impulses cannot be excited in, or made to traverse, sensory nerves, nor can sensory impulses be developed in or made to traverse motor nerves. The nature of the impulse is the same, whatever the cause that excites it, and within certain limits its strength is proportional to the strength of the exciting cause. Impulses arising in one set of nerves, as the sensory, are transmitted to the other, as the motor, through nerve centers in which the fibers of these nerves intermingle. If one lays his hand upon the point of a tack, the injury excites an impulse in the sensory nerve. This is carried inward until the fibers



BIRDS' NESTS

1, Red-Eyed Vireo (1-3).
2, Redstart (1-3).
3, American Goldfinch (1-3).

4, Bluebird (1-3).
5, Humming Bird (1-2).
6, Phoebe (1-4).

7, Meadow Lark (1-5).
8, Bluejay (1-5).
9, Baltimore Oriole (1-5).

of the injured nerve mingle with those of the corresponding motor nerve, when the impulse is transmitted outward along the motor nerve and causes the hand to be withdrawn from the object. Movements of this sort are known as reflex. See REFLEX ACTION.

HYGIENE. The nervous system is the most sensitive organism of the body, and consequently it is most easily influenced by unfavorable conditions. The first requisite to its health is a good supply of pure blood. About one-fifth of the blood in the body is required to nourish the brain, and the other organs of the nervous system require a proportionately large amount. If the blood is impure, the brain and nerves are not properly nourished. Pure air, plenty of exercise and nourishing food are essential to pure blood and thus to the health of the nervous system. Another important requisite is a sufficient amount of sleep and rest. See SLEEP.

Many drugs used for the alleviation of pain are beneficial when administered under the direction of a physician, but they are decidedly injurious when taken indiscriminately, and their continuous use soon produces a habit which it is almost impossible to break. Among drugs whose use should be avoided, except when prescribed by a physician for a limited time for the alleviation of pain, are chloral, cocaine, opium, morphine and numerous coal tar preparations, such as antifibrin and antipyrin. These drugs act directly upon the nerve centers, dulling their sensitiveness, preventing proper nutrition of the nervous system and in every way impairing its usefulness.

The habitual use of alcoholic and malt liquors and tobacco has a similar effect. These substances are especially injurious to the young, whose nerves and brain are in a formative condition. Perhaps the greatest danger arising from the use of any drug or narcotic is the tendency to form an unnatural appetite for it, which increases with the habit, until the person becomes overpowered by the craving. For these reasons, as well as many others of which the limits of this article will not admit mention, substances of this sort should be strictly avoided.

Nest, the name given to the homes built by birds, chiefly as safe places in which to hatch their eggs and rear their young. Nearly all birds build nests of some sort, and the marvelous instinct that leads every bird to build its nest exactly as its parents did before it, is one of the strangest things in nature. Birds rarely give any attention to the comfort of themselves

in the building of their nests. They prepare a place which will insure the hatching of their eggs and the protection of their young while they are helpless. A few species, however, build no nests at all, but drop their eggs into the nests of other birds and abandon them to the foster parents. For instance, the American cowbird will lay its eggs in the nest of the yellow warbler. Not infrequently the warbler resents the presence of this foreign egg and builds a second nest above the first, abandoning its own eggs in so doing. Examples are known where a nest has been built in this way in three tiers before the warbler was able to remain in undisturbed possession of her own nest. There are other species that lay their eggs upon the bare rocks or in little holes in the sand and sit patiently upon them there. Most of the water fowl and many of the shore birds build their nests upon the ground. In nearly all cases some attempt is made at concealment, and even when the nests are rudest, the bird still remembers to make them harmonious with their surroundings, or to put them in some inconspicuous place. The wild turkey will never leave her nest until she has safely covered the eggs with leaves. Although some of the ground nests are little more than rude platforms of twigs, others are elaborately woven and carefully lined with soft moss or even with down plucked from the breast of the bird herself. In the tropics, some birds collect large piles of vegetable matter, and after it has decayed for some days, they will lay their eggs in holes in this mass, which in rotting furnishes the heat to hatch the young chicks. The kingfishers, sand martins and other birds excavate deep burrows into a bank, usually facing the water, and lay their eggs in rude little nests at the end. These burrows are usually not straight. The kingfisher's gallery may turn abruptly to the right or left. The petrel found in the United States digs a very tortuous gallery of considerable length, so that its nest is frequently directly under the opening. In the southwestern parts of the United States the burrowing owl lives in the homes of the prairie dogs.

The most remarkable nests, however, are those which are built either in trees or in small shrubbery above the surface of the ground. Here the diverse habits of the birds show themselves at once. The robin and some others make a foundation of clay, which they cover with twigs and leaves and line with hair or other soft substances. The clay is molded and carefully plastered in position, but neither the robin nor

the swallow, who builds a purely clay nest, will use the structure until it is well dried. Some of the bottle-shaped clay nests of the swallows are curious affairs, with protruding necks bent downward so that the opening of the nest is from below. Woodpeckers dig their way into dead trees or stumps. The ivory-billed woodpeckers are strong enough to excavate a nest in the hardest wood. Many other birds build in holes or crevices in trees and stumps that they have not excavated for themselves. An example of this class is seen in Fig. 4 of the color plate. A familiar example of the best of the nest work is that of the Baltimore oriole, whose slender hanging nest, far out on the tip of some slender twig, is well protected against invasion. Fig. 9 of the color plate shows the oriole's nest, which is always closely woven, but is more elaborate and better constructed by those birds which live around dwellings where they are able to get twine or cotton and wool. The weaver birds make curious, swinging, bottle-shaped structures, which are entered from below, the nest itself being built within, on the side of the bottle. Other species are even more remarkable, for many pairs of birds join in building a huge shed-like structure, in which they place their nests, each separate from the other and all communicating with the outside by a separate passageway. In Mexico a flycatcher builds a remarkable structure, sometimes three or four feet long by two wide, on one side of which is an opening leading into the nest. Other small and timid birds build their nests in crevices on the outside of the flycatchers' home. Some of our birds build exquisite little nests, and nothing is prettier than the delicate work of the ruby-throated hummingbird, as may be seen in Fig. 5 of the color plate. The tailor bird sews the leaves of its nest together. The great variety and wonderful forms of the nests prevent giving any extended description of them all.

Nes'tor, a Greek hero, son of Neleus, king of Pylos. He took part in the hunting of the Calydonian boar, in the Argonautic expedition and, although he was at that time very old, in the Trojan War. During that struggle he was the wisest adviser of the Grecian chiefs.

Nesto'rians, a Christian sect of western Asia, named from their founder, Nestorius. They denied the union of the divine and human natures in Christ, holding that he possessed two distinct personalities, the union between which was merely moral. After the Council at Ephe-

sus the Nestorians were driven by imperial edicts into Persia, where they firmly established themselves. The greater number of the churches perished under Timur's persecutions. Most of the survivors were converted to Catholicism and are now known as Chaldeans. The remnant of the sect live in Persia and Turkey and number about 80,000.

Net, an open fabric, made of thread, twine or cord, woven into meshes of fixed dimensions, firmly knotted at the intersections. Nets are used for a great variety of purposes, as for protecting fruit trees, for collecting insects, for hammocks and for screens, but chiefly for hunting and fishing. The chief kinds of nets used in fishing are the trawl, the drift, the seine, the kettle, or weir, and the trammel, or set net. The *trawl* is a triangular bag, with an arrangement for keeping its mouth open, and it is drawn along the bottom of the water. *Drift* and *seine* nets are very long in proportion to their breadth and differ from one another only in the manner in which they are employed. The seine has a line of corks along one of its long borders, and a line of leaden weights along the other, so that when thrown into the water it assumes a perpendicular position. It is used near the shore, being dragged to land with any fish it may enclose, by ropes fastened to the ends. The drift net is not loaded with lead, but floats in the water, and is used especially in herring fishing, the fishes as they drive against it becoming caught by the gills. *Kettle* and *weir* nets are structures fixed on stakes placed along the coast between high and low water. *Trammel* or *set* nets are also fixed between stays, but act like drift nets. See ANGLING.

Net, a term applied to that which remains of a weight or quantity after making certain deductions. Thus, *net weight* is the weight of merchandise after allowance has been made for casks, bags, or any enclosing material. *Net profit* is the proceeds of a transaction, after all expenses are paid.

Neth'erlands, THE, or Holland, a kingdom of Europe, lying on the western border of the continent, bounded on the w. and n. by the North Sea, on the e. by Prussia and on the s. by Belgium. It lies between 50° 45' and 53° 32' north latitude and between 3° 25' and 7° 12' east longitude. Its area is 12,648 sq. mi., a little more than that of Maryland, and its population in 1911 was 6,022,452. The country is divided into eleven provinces—North Brabant, Gelderland, South Holland, North Holland,

Zeeland, Utrecht, Friesland, Overijssel, Gröningen, Drenthe and Limburg.

SURFACE AND DRAINAGE. The country forms, with part of Belgium, the lowest region of Europe. Some portions of the surface of the Netherlands are from sixteen to twenty feet below the level of the sea, and nearly all parts are too low for natural drainage. In great part the coast is so low that, were it not for massive dikes, large areas would be inundated. In the interior, also, dikes are a common feature, being built to protect portions of land from the lakes and rivers or to enable swampy pieces of land to be reclaimed by draining. These enclosed lands are called *polders*, and by the formation of these polders the available land of the country is being constantly increased in area. Lakes and marshes are converted into fertile fields, and considerable areas are even rescued from the sea. One of these reclamations was the lake of Haarlem, the drainage of which was begun in 1840 and finished in 1853. This has yielded about 72 square miles of good land. The project of draining a great part of the Zuyder Zee is under way at present.

Almost the only highlands in the Netherlands are the sand hills, about 100 to 180 feet high, which form a broad, sterile band along the coast of South Holland and North Holland, and a chain of low hills, probably of similar origin, southeast of the Zuyder Zee. The highest elevation, 1050 feet, is in the extreme southeast. The general aspect of the country is flat, tame and uninteresting, and about one-fifth of the whole surface consists of marsh, sand, heath or other unproductive land.

The coast line of the Netherlands is very irregular, the largest indentation being the Zuyder Zee. In the same line with the sand hills, extending past the mouth of the Zuyder Zee, runs a chain of islands, namely Texel, Vlieland, Ter Schelling, Ameland and others, which seem to indicate the original line of the coast before the ocean broke in upon the low lands. The most important rivers of the Netherlands are the Rhine, the Maas, or Meuse, the Scheldt and the Yssel. The Rhine is over one-half mile wide where it enters the country. It soon divides, the south arm, which is the more important division, taking the name of Waal and uniting with the Maas, while the north arm, communicating with the Yssel, takes the name of Lek. The Maas, entering the Dutch Netherlands from Belgium, receives the Roer. Of the Scheldt, little except the mouths is within the boundary

of the Netherlands. The navigable canals are collectively of more importance than the rivers. The chief of these are the North Sea Canal, 15 miles long, between the North Sea and Amsterdam, and the North Holland Canal, 46 miles long, between Amsterdam and the Helder. There are numerous smaller canals, all of the towns and many of the villages being connected with one another in this manner. Most of the domestic traffic of the country is over these canals. Lakes are very numerous.

CLIMATE. The climate of the Netherlands is humid, changeable and disagreeable. The range of temperature is not great, as the average temperature for the coldest months is slightly over 35° F., the average temperature for the hottest months slightly over 64° F.

INDUSTRIES. As the land of this coastal plain is composed largely of debris brought down to the sea by the agency of ice or water, minerals are very scarce. Coal is mined in small quantities. Peat is very plentiful, and the cutting of peat is an industry of some importance. Gardening and agriculture have attained a high degree of perfection. Wheat, while of excellent quality, can be grown only in favored portions of the southern provinces; rye, oats, buckwheat, horse beans, beets, madder and chicory are more common crops. Tobacco is cultivated in the provinces of Gelderland, South Holland and Utrecht; flax in North Brabant, the south of North Holland, Friesland and Zeeland; hemp, sugar beets, oil seeds and hops, in various parts of the kingdom. Culinary vegetables are cultivated on a large scale. Large quantities of them are sent to England, and the exportation of the seeds forms an important article in Dutch commerce. The cultivation of flowers has been carried to a point unequaled in any other country of Europe, and flower seeds and bulbs are exported to all parts of the world.

Stock raising is the most important industry of the Netherlands, especially in the coast provinces. Cattle, horses, sheep, swine and goats of excellent breed are reared in great numbers. Dairy products, especially cheeses, are marketed in immense quantities. In the estuaries of the great rivers, in the coast waters and in the open sea, fishing is very extensively carried on. Sprats and oysters are the chief products of the coast fisheries, and herring is the principal product of the deep-sea fisheries. Hundreds of thousands of herring are taken annually.

Manufactures in the Netherlands, while numerous and flourishing, are not one of the most

important of the industries. Woolen and cotton cloth, silks and velvets are produced in considerable quantities, and linen of excellent quality is manufactured in the southeast and in North Brabant. Pigments, brandy, gin, paper, glass, earthenware, brick and tiles are among the other leading manufactures. The glazed ware for which Delft has long been famous is still produced there.

TRANSPORTATION AND COMMERCE. The canal system is so general that railroads are of importance chiefly for international, rather than internal, commerce. There were, in 1910, 2000 miles of railway in operation, besides 1500 miles of tramways and 2000 miles of canals.

The Netherlands is one of the important trading countries of the world. The trade is chiefly maritime, and much of it is in the nature of carrying trade. In 1910 the imports were about \$1,306,000,000, the exports about \$1,052,000,000. The foreign commerce is chiefly carried on with Germany, Great Britain, Belgium, the Dutch East Indies and the United States. Rotterdam and Amsterdam are the centers of the foreign trade. The importation and re-exportation of the products from the Dutch colonies throughout the world is one of the chief branches of the commercial activity.

INHABITANTS. The stock to which the people belong is Teutonic, the great majority of the inhabitants being descendants of the old Batavians. These comprise over 70 per cent of the population and are chiefly settled in the provinces of North and South Holland, Zeeland, Utrecht and Gelderland. The Flemings, of North Brabant and Limburg, and the Frisians, of Friesland, Groningen, Drenthe and Overijssel, form the other groups. According to the census of 1910 there are only 70,000 people of foreign birth living in the Netherlands. The emigration from the country is very small.

EDUCATION. Elementary schools are everywhere established and are partly supported by the State, but education is not compulsory and the proportion of illiterates is large. Higher schools exist in all the chief towns, and there are four universities—at Leyden, Utrecht, Groningen and Amsterdam.

LANGUAGE AND LITERATURE. The language which is spoken in the kingdom, as well as in the East and West Indian colonies of the Netherlands and by the Boers in South Africa, is called Dutch. This word, which comes from *Dietsch*, means vernacular language and was originally applied to distinguish the popular speech from

the Latin. In its present form, as well as in its earlier stages, the Dutch is well-nigh identical with Flemish, the language of the Low German inhabitants of Belgium. In its structure, Dutch is closely allied to German, but it is written in the Roman alphabet, and capitals are used almost exactly as in English.

The earliest Dutch literature consists of versions of the Arthurian legends, the song of Roland and other French romances, and some of these date from early in the thirteenth century. A version of *Reynard the Fox*, produced about 1250, is the first noteworthy example of literature in the Dutch language. The Old Testament had been translated and the *Life of Jesus* produced before the Reformation, which affected Dutch literature strongly, as it did that of other countries. The contest with Spain late in the sixteenth century gave rise to many battle songs and hymns in praise of liberty. By the beginning of the eighteenth century, poetry and the drama, which had flourished during the previous century, had become so greatly affected by French literature as to retain little of their distinctively national character. During the nineteenth century perhaps the most noteworthy men in Dutch literature were Lennep, Dekker and Maartens, novelists; Hasebroek, an essayist; the poets Genestet, Da Costa and Ten Kate, and the critic Ten Brink.

ART. See **PAINTING; SCULPTURE.**

COLONIES. In addition to her European territories, the Netherlands possesses extensive colonies and dependencies in the Asiatic Archipelago and in America. These possessions include the Dutch East Indies, Dutch Guiana, or Surinam (See **DUTCH GUIANA**), and the West Indian islands of Curaçao, Buen Ayre, Eustatius, Saba, Aruba and half of Saint Martin. The total area of the Dutch colonial possessions is about 783,000 square miles, and the total population about 36,000,000.

GOVERNMENT AND RELIGION. The government of the Netherlands is an hereditary constitutional monarchy, the executive power being vested in a king or queen, and the legislative in the parliament, or States-General, of two chambers. The upper chamber consists of 50 members, elected by the provincial councils, or assemblies of the eleven provinces; the lower chamber consists of 100 members, chosen by direct suffrage, which is limited by a considerable property qualification. The term of members of the upper house is nine years, that of members of the lower house, four years.

Complete religious freedom exists in the Netherlands. The Protestants, who constitute about three-fifths of the population, belong for the most part to the Dutch Reformed Church. Second in size is the Roman Catholic Church. The Jansenists number about 9000, and the Jews over 100,000.

CITIES. The chief cities of the Netherlands are The Hague, the capital; Amsterdam, Rotterdam, Utrecht, Groningen, Haarlem, Arnhem and Leyden. These are all described under their titles.

HISTORY. The Netherlands comprised originally the territory embraced by the present kingdoms of the Netherlands and Belgium. The Romans, who subjugated the native tribes in the first century of the Christian era, ruled the country until about the beginning of the fifth century, when the Franks crossed the Rhine and conquered the southern part. Although for a time the Frisians in the northern part of the country preserved their independence, about the eighth century the whole territory was incorporated in the Frankish Empire, and the people were converted to Christianity. When Charlemagne's empire was divided after the death of his son, Louis the Pious, the region of the Netherlands was divided into three parts, the northern part falling to Germany, the central to Lotharingia and the southern to France. Gradually the northern province became distinctly German in language and customs, and the southern part became French, while the central province combined the characteristics of the two others. In the latter part of the Middle Ages the cities of the Netherlands, especially Bruges, Ghent and Antwerp, rose to great prosperity and became of immense importance through their commerce and manufactures. In the fourteenth century the entire territory passed under the rule of the dukes of Burgundy, and through the marriage of Mary of Burgundy, the daughter of the last duke, with Maximilian of Austria, the Low Countries became a possession of the House of Hapsburg. Under the grandson of Maximilian, Charles V, the Netherlands were first formally united with the Spanish crown.

This union was disastrous for both countries, because the greater part of the inhabitants of the Netherlands were strongly Protestant, while Spain was the most radically Catholic country of Europe. Charles V, who had been born in the Netherlands and loved the Dutch people, did little toward enforcing the Catholic religion,

but his son, Philip II, oppressed the Dutch beyond the limits of endurance. Finally, under the leadership of William of Orange and the counts Egmont and Hoorne, the people rose in rebellion. The duke of Alva was sent with a Spanish army to the country and was instructed to deal with it as conquered territory. Persecution began at once, and several of the most prominent and patriotic citizens, among them the counts Egmont and Hoorne, were put to death. In 1568 William of Orange, who had escaped death by withdrawing from the country, returned and undertook its liberation. During the war which followed, many prosperous Dutch towns endured sieges and were sacked when captured. The hatred for Alva increased, and as Philip II was not satisfied with the effects of his rule, he recalled him and sent in his place Requesens. In 1576 the southern provinces entered into an alliance with the northern provinces, which was known as the Pacification of Ghent; but Alexander Farnese, who became viceroy of the Low Countries in 1578, was able by diplomatic measures to separate the southern provinces from the northern and to induce the former to return to their allegiance to Spain. The northern provinces, however, by the Union of Utrecht, in 1579, declared their independence of Spain. William of Orange now became the ruler of Holland and Zeeland, and the duke of Anjou, the brother of Henry III of France, assumed control of the other provinces. In 1584 William of Orange was assassinated (See WILLIAM, PRINCE OF ORANGE, COUNT OF NASSAU). From this time on, Philip was too much occupied with affairs in France and England to give much attention to the Netherlands, but Austria carried on the struggle against the United Provinces, and although the Dutch were everywhere successful on the sea, the country was desolated by the wars and a twelve years' truce was concluded in 1609.

The independence of the Netherlands was now recognized by all the powers except Spain, but it was not fully assured until the Peace of Westphalia, at the close of the Thirty Years' War. In the seventeenth century the Netherlands became one of the foremost commercial and maritime powers in the world, and for a long time maintained dominion on the sea. The southern provinces were ruled first by Spain and then by Austria, and in 1797 they came under the power of the French Republic. In 1806 Napoleon made the Netherlands into a kingdom for his brother Louis Bonaparte,

and in 1810 this kingdom was united with France. The Congress of Vienna in 1815 joined Belgium and the Netherlands in a single kingdom with William I, the son of the last stadtholder, as king. This arrangement was very unsatisfactory, as the inhabitants of Belgium were almost all Catholics and the inhabitants of the Netherlands were with few exceptions Protestants. In 1830 Belgium declared itself independent, and although the king of the Netherlands made determined efforts to put down the revolt, the European powers at length intervened and guaranteed the independence of Belgium (See BELGIUM, subhead *History*). The people of Holland under William II and William III obtained increased freedom and prosperity. Upon the death of William III, in 1890, Wilhelmina became queen, under the regency of her mother. In 1908 she became of age, and was formally crowned queen. In 1898 The Hague was chosen as the meeting place of the International Peace Congress, and following this came the establishment at The Hague of a permanent International Tribunal for arbitration. In 1913 the suffrage was granted to women. See PEACE CONFERENCE, INTERNATIONAL.

Consult E. de Amicis's *Holland and Its People*; William Elliot Griffis's *The American in Holland*; John Lothrop Motley's *Rise of the Dutch Republic*.

Neth'ersole, OLGA (1870—), an English actress, born in London. She made her début in London in 1888, attaining her first success in *The Profligate*. Two years later she toured Australia and in 1894 came to America, where, in *Camille*, *Carmen*, *Sapho* and other rôles, she won great popularity. She made several later tours of America, though she scarcely attained her former success.

Net'tle, the name given to a large family of plants. The species are usually covered with extremely fine, sharp hairs, filled with a bitter fluid, which causes inflammation and pain when injected into the skin. Nettles yield a tough fiber, which may be used as a substitute for hemp. In Dresden a thread is produced from nettles, which is so fine that sixty miles weigh only two and one-half pounds. One kind of nettle is used in China to make the China grass-cloth, and various other species are used for textile purposes.

Nettle Tree, a name applied to several trees which belong to the nettle family but lack the stinging qualities. The common or Euro-

pean nettle tree grows to the height of thirty or forty feet and is frequently planted for ornament in the south of France and north of Italy. The wood is useful for various purposes. One species, sometimes called the sugar berry, is a much larger tree, often attaining a height of from sixty to eighty feet. It is a native of North America from Canada to Carolina. Another variety, the American nettle, is often called hackberry.

Neuchâtel, *nō sha tel'*, a town of Switzerland, the capital of the canton of the same name, on Lake Neuchâtel, 25 mi. w. of Bern. It has some beautiful streets and interesting buildings, among which the most noteworthy is the twelfth century abbey church. The city possesses a library of 100,000 volumes, a museum of fine arts, a museum of natural history, an observatory and a number of schools. Watches and jewelry are manufactured, and the trade of the town is considerable. Population in 1910, 23,505.

Neuchâtel, LAKE OF, a lake of Switzerland, in the western part of the country, 18 mi. n. of the Lake of Geneva. It is the third largest lake of Switzerland and is 24 miles long and from 2 to 5 miles wide. Its shores, which are in part low and marshy, have comparatively little of the picturesque beauty of the other lakes of Switzerland.

Neumecklenburg, *noi mek'len boorK* (formerly New Ireland), the second largest island of the Bismarck Archipelago, in the Pacific Ocean, 350 mi. n. e. of New Guinea. Its area is about 4900 square miles. The islands are volcanic, but the soil, at least on the coast, is very fertile. As the climate is unhealthful, the island has never been permanently colonized by Europeans.

Neuralgia, *nu ral'je ah*, the name applied to a condition of the nerves that gives rise to severe pains in the course of one or more distinct nerves only, being, by this localization, distinguished from other pains. In neuralgia of the fifth nerve, the pain is in one-half of the face, and if the central branch is affected, the pain is confined to the upper jaw. Neuralgia of the intercostal muscles manifests itself in a circle of pain around the breast. Among the numerous causes of neuralgia are injuries to the nerve, inflammation of the nerve itself, irritation of the nerve produced by ulcers or swellings in the adjacent parts, especially in the cavities of the teeth. Thin-blooded persons and those of weak nerves are most liable to be affected by neuralgia, which varies much in degree and

duration. The pain is usually greatest at night, though it may reappear suddenly at intervals during the day. Heat and cold seem to increase it. Neuralgia often becomes chronic, and not infrequently it appears suddenly in such diseases as typhus or intermittent fevers.

Neuras'theni'a (nerve weakness), a disease of the general nervous system, very common in the United States and, in fact, in all parts of the world. It comes as a result of continuous strain or excess of any sort. Overwork produces a large proportion of the cases, but excessive use of tobacco and stimulants or vicious habits of any sort are prolific causes. It affects the sexes about equally and is usually chronic, because the causes which produced it have been long standing and the restoration of power in the nerves themselves is always a slow and difficult process. The symptoms of neurasthenia are multitudinous; the functions of almost every organ may be affected by it and may show their weakness by the symptoms which are characteristic of diseases of that organ. Nervousness, irritability, loss of sleep and impaired digestive functions are always present to a greater or less degree. When there are no organic diseases connected with it, neurasthenia may be cured, especially in its earlier stages, if the causes are removed and proper attention is given to diet and rest. Rest and freedom from care and worry, in connection with active out-door life, are the best remedies.

Neuritis, inflammation of a nerve. Tenderness in the course of the nerve and pain recurring in paroxysms are among the symptoms. Paralysis may occur as a result, and in the case of a special nerve of sense, loss of the particular sense. Neuritis of the optic nerve, for instance, is a frequent cause of blindness.

Neuropt'era, the name given to a great family of insects, because the supporting ribs of their wings are large and conspicuous, giving them a network-like appearance. The mouth is adapted to chewing, the head is large and distinct from the thorax and the antennae are generally slender. The Neuroptera have no stings. The springtails, May flies, dragon flies, ant-lions, scorpion flies and caddis flies are examples. The last three groups, however, are now set farther along in the classification, because the basis of classification is no longer exclusively in the wings, but is dependent upon the extent and character of the metamorphosis through which the insects pass. See ANT-LION; DRAGON FLY.

Neuro'sis, a name common to diseases of the nervous system which are not accompanied by any discoverable alteration in structure; that is to say, *functional* diseases of the nervous system. Hysteria, for example, is a neurosis; catalepsy, some such form of mental disease as melancholia, various forms of neuralgia and spasm, are also called neuroses.

Neurot'ic, a term introduced into medicine to indicate some relationship to the nervous system. Thus, a neurotic disease is a nervous disease. Such medicines as opium and strychnine are called neurotics, because they affect the nervous system. The word *neurotic* is now applied very generally to the person who suffers from nervous weakness or a nervous disease.

Neutrality (Latin, *neuter*, neither), in the law of nations, that state of a nation in which it does not take part directly or indirectly in war between other nations. To maintain itself in this state a nation is often obliged to assume a threatening position, to be able to repel, in case of necessity, every aggression on the part of either of the belligerents. Such neutrality is termed an *armed neutrality*. In maritime wars, the treatment of effects of the enemy on board neutral vessels or of neutral effects on board hostile vessels, gives rise to very important questions. In former times, the principle was generally admitted that the ownership of goods on board of the vessels was the only point to be considered. The belligerents, therefore, seized merchandise belonging to the enemy on board of neutral vessels; but they restored neutral property seized under the enemy's flag. The plenipotentiaries of Great Britain, Austria, France, Prussia, Russia, Sardinia and Turkey, assembled at Paris in April, 1856, agreed that thereafter the neutral flag should protect an enemy's goods, with the exception of contraband of war, and that neutral goods, with the exception of contraband of war, are not liable to capture under the enemy's flag. In the arbitration (in 1872) at Geneva of the *Alabama* claims of the United States against Great Britain, three rules were agreed to by the parties, namely, that a neutral government is bound to use due diligence to prevent the fitting out in, or departure from, its ports, of a vessel which is intended to carry on war with a power with which the neutral power is at peace; that it is bound not to permit a belligerent to make use of its ports as a basis of naval operations or as a source of recruitment of men or military supplies; that it is bound to exercise due diligence in its own ports or waters,

and that, as to all persons within its jurisdiction, it must prevent any violation of these duties and obligations.

Neutral Nation, an Indian tribe of the Iroquois family. They formerly occupied the region along the north shore of Lake Erie in Ontario, and extending eastward as far as the Genesee River in New York. The name *Neutral* was given them by the French, because they took no part in the long war between the Hurons and the Iroquois. Their proper Indian name is not known, though various names were given them by different tribes. After the destruction of the Hurons by the Iroquois, the latter invaded the country of the Neutral Nation and utterly destroyed them in 1651. The final battle took place at a fortified Neutral town. Those who survived the conquest were taken into the tribes of their conquerors, or were scattered in small bands among the tribes further west or south. The victors also took possession of the conquered territory as far west as Lake Erie.

Neuville, *nō veel'*, ALPHONSE DE (1836-1885), a French painter and illustrator. After studying law for three years, during which time he did much sketching, he determined to devote his life to art. Having served as an officer in the Franco-Prussian War, he was furnished with material for his war pictures. He was not successful in his use of color, but he had the power of drawing very vivid scenes and making his figures natural and lifelike.

Ne'va, a river of Russia, which issues from Lake Ladoga at its southwestern end, and after flowing westward for 45 miles discharges into the Gulf of Finland through several mouths. The Neva is an important commercial waterway, since it is connected through the system of Ladoga Canals with the Volga. It constitutes the most northerly section of the inland waterway connecting the Caspian Sea with the Baltic. The river contains a great volume of water, and in places its channel is over a half-mile wide. In some places extensive engineering works have been constructed to make it navigable. Petrograd is on the Neva.

Nevada, *ne vah'da*, the SAGEBRUSH STATE, one of the Pacific states, bounded on the n. by Oregon and Idaho, on the e. by Utah and Arizona and on the s. w. and w. by California. Its greatest length from north to south is 483 mi., and its greatest breadth from east to west, 320 mi. The area is 110,690 sq. mi., of which about 869 sq. mi. are water. Population in 1910, 81,875.

SURFACE AND DRAINAGE. The most of the state is in the area included within the great basin and is the bed of an ancient sea, whose shore lines can be distinctly traced in a number of places. This basin lies between the Sierra Nevada Mountains, on the west, and the Wasatch, on the east. The average altitude of the plateau is about 4000 feet, and upon it mountains rise to altitudes varying from 1000 to over 8000 feet. The highest point in the state is Wheeler Peak, at about the center of the eastern boundary, whose altitude is 13,058 feet. Distributed over the plateau and running principally in north and south directions, are numerous minor or smaller mountain ranges, whose altitudes vary from 6000 to 8000 feet. In some sections there are also ranges extending approximately east and west. Many of the ranges contain numerous passes, and others have been worn away so that only isolated peaks now remain.

The state has but few rivers, and these are small. In the northern section the Owyhee flows into Snake River and thence to the Columbia. The Humboldt, rising in the northeastern part of the state and flowing in a southwesterly direction for about 375 miles into Humboldt Lake, is the largest river in the state. In the southeastern section a few small streams drain into the Colorado, which forms a part of the southeastern boundary. With these exceptions, the streams of Nevada find no outlet to the ocean. Most of them are mountain torrents, which disappear on reaching the lower levels, either in mountain lakes or in swamps known as *sinks*.

There are a number of lakes in the state. Of these Pyramid is the largest, with a length of 35 miles and a width of 10 miles. Lake Tahoe, on the California boundary, 6225 feet above the sea, is, because of its altitude, its great depth, the clearness of its waters and the remarkable beauty of its surroundings, one of the foremost of American mountain lakes and is visited by a large number of tourists each year.

CLIMATE. The climate is dry, mild and healthful. Severe winds are seldom met; the average temperature for January is about 28°, and for July, about 71°. The thermometer occasionally falls as low as 30° below zero and sometimes rises to 110° above, but these extremes seldom occur. The state is the most arid in the Union, the average rainfall being less than 12 inches, and this is very unevenly distributed as to time and locality. Most of the rain occurs between December and May, and

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the northern counties receive nearly double the amount received in other portions of the state, while in many valleys and in the southern part of the state rain seldom, if ever, falls.

MINERAL RESOURCES. Nevada is preëminently a mining state, and its development was due to the rich deposits of gold and silver found in the mountains years ago. It was here that the celebrated Comstock lode, which at one time produced over \$38,000,000 worth of bullion in a year, was discovered (See COMSTOCK LODE). Numerous other rich mines have also been located within the state, but when the most valuable deposits in these mines had been exhausted, the mining industry declined for a number of years. More recently, however, new mines have been opened in Tonopah and Goldfield, and there has been a second revival of the mining industry. The annual output of gold is now nearly \$20,000,000, and of silver, about \$7,000,000. Lead, copper, quicksilver and nickel are also found in paying quantities. Besides the metals, there are extensive deposits of such minerals as borax, soda, silver, potash and rock salt, while marble, granite, alabaster, slate and other valuable building stones are found in large quantities. Some lignite coal has been mined in Elko county.

AGRICULTURE. The lack of rainfall and the distance from markets prevent agriculture from being largely developed in Nevada. The soil is generally fertile, and, wherever irrigated, it produces abundant crops of hay, cereals and hardier fruits, such as apples, pears and cherries. Along the valley of the Humboldt and the Carson Rivers and throughout the west central portions of the state, there are large tracts of irrigated land, and numerous farms are found in these regions. In other sections, where there is an abundance of prairie grass, stock raising has become an industry of some importance. The mild climate enables stock to roam without shelter during the winter, and large numbers of cattle and sheep are raised. See IRRIGATION.

MANUFACTURING. The manufactures are few. The most important are connected directly or indirectly with mining, being the smelting and refining of ores and the making and repairing of such machinery and tools as are needed for mining purposes. There are a few local industries, such as flour and grist mills and car repair shops.

TRANSPORTATION. Nevada has but few lines of railway. The Southern Pacific crosses the northern portion of the state, following for most of its route the valley of the Humboldt River.

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This line has constructed a branch northward from Reno, near Albucera, near the northern boundary, and another southward to Walker Lake. The San Pedro, Los Angeles & Salt Lake road also crosses the southeastern part of the state, but the greater portion of the region is without railway communication.

GOVERNMENT. The legislature is composed of two branches, and the membership of both cannot exceed 75. The senate cannot have less than one-third nor more than one-half as many members as the house of representatives. Members for each branch are elected for two years. The legislature meets biennially, and the session is limited to sixty days. The executive department consists of the governor, the lieutenant governor, the secretary of state, the treasurer, the comptroller, the surveyor-general and the attorney-general, each elected for four years. The courts include one supreme court and a number of state district courts, below which are the justice courts and certain special courts of cities and towns.

EDUCATION. Considering its sparse population, the state maintains a good system of schools at a large expenditure per capita. There are high schools in all of the important towns and a state university and agricultural experiment station, located at Reno, and all rural communities are provided with about seven months of school per year.

INSTITUTIONS. The state maintains a hospital for the insane at Reno, an orphans' home at Carson and a state prison at Carson.

CITIES. The chief cities are Carson City, the capital; Reno, and Virginia City, each of which is described under its title.

HISTORY. Nevada was first visited by Spanish friars about 1775. After 1825 trappers entered the region, and Fremont crossed it on his way to California in 1843. It was a part of the territory ceded to the United States by Mexico, by the Treaty of Guadalupe Hidalgo, Feb. 2, 1848, and it was constituted a territory in 1861, with somewhat smaller boundaries than at present. Its area was gradually increased until 1866. Nevada was admitted into the Union as a state in 1864. Although the Mormons had established a camp in the region in 1848, its real history begins with the discovery of silver there in 1859. Owing to the decline of gold and silver mining during the last ten years, the other industries, as well as the population of the state, have decreased. Consult Bancroft's *Nevada and Her Resources*.

Nevada

Nevada, Mo., the county-seat of Vernon co., 100 mi. s. of Kansas City, on the Missouri, Kansas & Texas and the Missouri Pacific railroads. The city is in an agricultural and stock-raising district, near zinc mines, and it has a considerable trade. It contains large zinc smelters, furniture and iron works and flour and planing mills. A state asylum for the insane is located here, and the city has the Cottey College for women, Saint Francis Academy and an orphanage. There is also an attractive park. The place was settled about 1830, was made the county-seat in 1858 and was chartered as a city in 1880. Population in 1910, 7176.

Nevada State University, a state university, established at Reno and opened in 1886. It is at the head of the educational system and is the only school in the state of collegiate grade. It maintains courses in classics, literature, science, agriculture, civil, mechanical and mining engineering and domestic science. There are also commercial, normal and preparatory departments. In connection with the university there is a school of mines at Virginia City. More than half of the students are women. The faculty contains about 25 members, and there are about 400 students. The annual income from all sources is about \$60,000.

Nevers, ne vair, a town of France, capital of the Department of Nièvre, on the right bank of the Loire at its confluence with the Nièvre, 140 mi. s. e. of Paris. It is built irregularly on the slope of a hill, and the older portion has narrow, crooked, unattractive streets. The new town, however, has wide, well-kept streets, and both portions contain some interesting buildings, among which are the Church of Saint Etienne, of the eleventh century; the Cathedral of Saint Cyr, built in the thirteenth century and recently restored; the Palais de Justice, and the lyceum. There are important industrial establishments, including pottery and porcelain works, which produce famous ware. Population in 1910, 30,000.

Nevin, ETHELBERT (1862-1901), an American composer, born at Edgeworth, Pa. He studied under the best instructors in America and Germany and, returning to his native country in 1887, devoted himself to composition. In 1900 he became an instructor in the Yale department of music. His most popular compositions are *Water Sketches*, for the piano, and the song, *The Rosary*. All his work is characterized by delicacy, originality and wealth of melody.

Newark

New Albany, awl'ba ny, IND., the county-seat of Floyd co., on the Ohio River, opposite Louisville, Ky., and on the Southern, the Baltimore & Ohio Southwestern, the Chicago, Indianapolis & Louisville and other railroads. Depauw College for women is located here, and the city has several academies, a public library, a fine city hall, a postoffice, a customhouse, large fair grounds and a national cemetery. It is two miles below the falls in the river and has good water power. The industrial establishments include glass works, packing houses, tanneries, engine and boiler works, furniture factories, woolen and flour mills, foundries and other factories. The place was laid out in 1813 and was made a city in 1839. Population in 1910, 20,629.

Newark, nu'urk, N. J., the county-seat of Essex co., on the Passaic River, about 3 mi. from its entrance into Newark Bay, and on the Pennsylvania, the Lehigh Valley, the Lackawanna, the Erie and the Central of New Jersey railroads. It is 8 miles west of New York City. Newark, which is the largest city of New Jersey, has an area of 22 sq. mi. and a water frontage of 10½ miles on Newark Bay and the Passaic River. The city is well built on a generally level plain, which slopes upward toward the west, the rise in ground affording a site for the most beautiful residence district. The park system is extensive and includes the beautiful thoroughfare of Broad Street, which is bordered by elm trees. Among the principal buildings of the city are the public library, the Peddie Memorial church, the government building and the Prudential Life Insurance building. The educational institutions include the Newark Academy, the Newark Seminary, Saint Benedict's College, the Newark Technical School, Saint Elizabeth's Academy and a system of public schools. Charitable and benevolent institutions are numerous and include nine public hospitals, among which is the Essex County Hospital for the insane; four orphan asylums, and a number of public homes. The city is well lighted, and the transportation, consisting of steam and electric cars, is very efficient. There are in Newark over three thousand manufacturing plants, which employ some 50,000 persons. Among the products of importance are jewelry, leather, celluloid, hats, shoes, harness, cut and stained glass windows, cutlery, clothing, rubber, beer and ale. The total annual value of the manufactured products is estimated at over \$100,000,000.

Newark

Near Newark are located the suburbs of Elizabeth, Montclair and the Oranges, which are the residence places of many of the business men of Newark. The city was settled in 1666 by a colony from Connecticut. Its first name was Milford, which was soon changed, however, to the present name. It was chartered as a town in 1712. During the Revolutionary War it took an active part, serving first as headquarters for Washington and later for the British. In 1836 Newark was incorporated as a city. Population in 1910, 347,469.

Newark, OHIO, the county-seat of Licking co., 33 mi. e. of Columbus, on the Licking River and the Ohio Canal and on the Pennsylvania, the Baltimore & Ohio and several electric railroads. The city is in an agricultural region, which contains, also, deposits of natural gas, coal and sandstone, and it has manufactures of electric cars, glassware, locomotives, stoves, flour, implements, chemicals and other articles. It has an attractive location, surrounded by hills, and contains a public library, fifteen churches, six banks and many well-paved streets. The Auditorium is a fine theater building, erected as a memorial to the soldiers of the Civil War. Near the city are extensive remains of the Mound Builders. Newark was settled in 1801. Population in 1910, 25,404.

New Bedford, MASS., one of the county-seats of Bristol co., 56 mi. s. of Boston, at the mouth of the Acushnet River, on New Brunswick harbor, which is an arm of Buzzard's Bay, and on the New York, New Haven & Hartford railroad. There are also electric railways to Fall River, Brockton and other places, besides steamboat lines to New York City and other ports. A lighthouse stands on Palmer Island, at the entrance to the harbor, and Fort Rodman is on Clark's Point. A large bridge spans the harbor to Fair Haven. The city covers an area of about twenty square miles, and the streets are mostly macadamized and well cared for. The educational institutions include the Textile School, the Friends' Academy, Swain Free School and a large library, opened in 1853. The Saint Luke's and the Emergency are the leading private hospitals. Other prominent buildings are the city hall, the county courthouse, the state armory, the Federal building, the Merchants' National Bank, the Odd Fellows' and Masonic buildings and a number of business blocks.

For almost a hundred years New Bedford was the greatest whaling port in the world, but

New Britain

since the middle of the nineteenth century that industry has declined, and manufacturing has been developed. The city now ranks first in the production of fine cotton goods and fine cotton yarns. Other important products are drills and tools, boots and shoes, fine oils, glass, paints and other goods. There is also a large trade in coal, cotton, lumber, fish and merchandise. The government is vested chiefly in a mayor and a council of two chambers. The place was settled in 1652, was incorporated as a town in 1787 and was chartered as a city in 1847. During the Revolution many privateers were sent out, and the town became a storehouse for captured prizes. September 5, 1778, it was attacked by the British, captured and almost all destroyed. The first ship built in New Bedford was one of those from which the tea was thrown into Boston harbor. Population in 1910, 96,652.

Newbern, N. C., the county-seat of Craven co., 107 mi. s. e. of Raleigh, on the Neuse River and on the Atlantic Coast Line and the Atlantic & North Carolina railroads. It has steamship connection with the other coast cities, contains hosiery, knitting, cottonseed oil and lumber mills, and fertilizer, cigar and other factories; it also exports fish and vegetables. The most important structures are the Federal building and the county courthouse. It was settled in 1710 by the Swiss, was for many years an important seaport and was, for a time, the capital of the Province of North Carolina. During the Civil War it was strongly fortified, but it was captured by General Burnside in March, 1862. Population in 1910, 9961.

New Brighton, PA., a borough in Beaver co., 29 mi. n. w. of Pittsburg, on the Beaver River and on the Pennsylvania railroad. It has a public art gallery, a hospital, a Y. M. C. A. building, a high school library and a public park. There are deposits of coal and clay in the vicinity. The river furnishes good water power, and the manufactures include pottery, brick, glass, flour, nails, wire and other articles. The place was settled in 1818 and was made a borough in 1838. Population in 1910, 8329.

New Britain, CONN., a city in Hartford co., 10 mi. s. w. of Hartford, on the New York, New Haven & Hartford railroad. It has very extensive manufactures of hardware, cutlery, tools, foundry and machine-shop products, knit goods, saddlery and other articles. A state normal school is located here, and the city contains a Roman Catholic cathedral and the New Britain Institute. The place was settled in 1687 and

was chartered as a city in 1871. New Britain was the birthplace of Elihu Burritt. Population in 1910, 43,916.

New Brunswick, *brunz'wik*, a province of the Dominion of Canada, is bounded on the n. by Quebec and Chaleur Bay; on the e. by the Gulf of Saint Lawrence and Northumberland Strait, which separates it from Prince Edward Island; on the s. by Nova Scotia and the Bay of Fundy, and on the w. by Maine and Quebec. A part of the western boundary is formed by the Saint John and Saint Croix rivers. The greatest extent from north to south is about 215 mi., and from east to west, a little less. The area is 27,985 sq. mi., or a little more than the combined areas of West Virginia and Rhode Island. The province has about 500 mi. of coast line, which contains a number of good harbors.

SURFACE AND DRAINAGE. The eastern part of the province, bordering on the Gulf of Saint Lawrence, is low, and the coast is marshy; but the southern coast, bordering on the Bay of Fundy, is high and contains numerous bluffs. There is a height of land which extends across the province from the northeastern to the southwestern corner and forms the watershed separating the rivers that flow directly into the Gulf and the Bay of Fundy from those that flow northward. This is a comparatively low ridge and nowhere attains an altitude of more than 1500 feet, but there are a few separate peaks which rise from 2000 to 2500 feet above the sea. In general, the surface of the province is that of an undulating plain or low plateau.

The Saint John is the principal river and drains nearly all the western half of the province. It enters the Bay of Fundy by a broad estuary, which is nearly 50 miles long. The most important streams flowing into the Gulf of Saint Lawrence or its coast waters are the Restigouche and the Little Miramichi. The Petitcodiac drains the southeastern part of the province and flows into Shepody Bay, the most northerly projection of the Bay of Fundy. Nearly all of these streams have broad estuaries, which render them navigable for some miles.

CLIMATE. New Brunswick is subject to severe winters and hot summers, although along the coast the changes are not as extreme as in the interior. During the winter the thermometer occasionally falls as low as 30° below zero, and in the hottest summer months it sometimes rises as high as 95°. The coast regions are subject to fogs during portions of the year, but

on the whole the climate is healthful, and the extremes of heat and cold are not felt, especially in the interior, because of the dryness of the atmosphere. The annual rainfall is a little over 40 inches.

MINERAL RESOURCES. Some coal of an inferior quality is found, but it is not mined to a great extent. There are also deposits of nickel, antimony, manganese and iron ore among the metals, while graphite, gypsum, limestone and a variety of stone suitable for whetstones and grindstones are found in paying quantities.

AGRICULTURE. The soil of the lowlands and along the streams is highly fertile, and the climate is well suited to the growing of all crops which can be raised in a cool temperate climate; consequently these regions are all occupied by farms; but in the uplands and hilly portions of the province the soil is less fertile and yields but scanty return to the husbandman. Originally nearly the entire province was covered with forests, which included both hard and soft woods. Among the soft woods, spruce, tamarack and fir predominate, and only a limited portion of the forests has been removed, hence much of the land is still untilled. The chief crops are hay and forage plants, buckwheat, wheat, oats and potatoes. Turnips and other root crops are also grown, and in some sections dairying and the raising of live stock are important branches of agricultural industry. Small fruits are raised in large quantities and marketed in New England cities.

OTHER INDUSTRIES. The fisheries are valuable and furnish occupation for a large number of the inhabitants. On both the Gulf and Bay of Fundy coasts, large numbers of cod, herring, smelt and other salt water food fish are taken, while the lobster fisheries are second to none on the Atlantic coast. Salmon also abound in the streams and lakes and are taken in large numbers. The annual value of the fisheries is over \$4,000,000.

Among the manufacturing industries, the production of lumber and of lumber and timber products is the most important. The supply of spruce also leads to the manufacture of large quantities of wood pulp. In some localities the manufacture of butter and cheese is also an important industry.

TRANSPORTATION. Each coast has a number of good harbors, and steamer connection is made between shipping ports and Portland, Boston and other important cities on the Atlantic coast of the United States. The Inter-Colonial and

Canadian Pacific railways also traverse the province, the former the eastern portion and the latter the western portion. Each of these lines has branches extending to important manufacturing and trade centers; a cross line from Fredericton to New Castle connects the two systems, so that the province is fairly well supplied with railway facilities, the entire mileage amounting to about 1500 miles.

GOVERNMENT AND RELIGION. The executive department of the government consists of a lieutenant governor and a council of six members. The lieutenant governor is appointed by the governor-general of Canada, with the advice of his council, for a term of five years. The legislature consists of a house of assembly of 46 members, elected for four years. All local administration is through the county councils.

The inhabitants are largely of English descent, and in religion they are divided between Catholicism and the various Protestant denominations, the Catholic Church having about one-third of the membership of the province. Among the Protestant denominations, the Anglican Church, Presbyterians, Methodists and Baptists have the largest number of communicants.

EDUCATION. The public school system is controlled by an educational council, of which the provincial superintendent is the head. There are no separate schools for Catholics and Protestants. The courses of study, the methods of instruction and the text-books are uniform throughout the province, and in addition to the elementary schools, normal schools are maintained. The province also provides for those students who wish to pursue a course of study at the University of Fredericton. There are a number of denominational colleges.

INSTITUTIONS. There is a general hospital at Saint John, also an industrial home for boys, besides institutions for the deaf and dumb. Hospitals for the insane are maintained in different parts of the province. There is no provincial penitentiary, but convicts are sent to the Dominion penitentiary at Dorchester, an institution maintained by the maritime provinces of the Dominion.

CITIES. The chief cities are Fredericton, the capital, and Saint John, each of which is described under its title.

HISTORY. New Brunswick was discovered by Sebastian Cabot in 1498 and with Nova Scotia formed the French colony of Acadia, which continued from 1604 to 1713, during which time it was alternately a possession of the

French and the English. In 1713, by the Treaty of Utrecht, it became a British province, but the boundaries were not determined until the Treaty of Paris, which closed the French and Indian wars. In 1755 a large number of the French inhabitants were compelled to leave the province because of their sympathies with the French. In 1784 Nova Scotia was detached, and New Brunswick became a separate province. At the formation of the Dominion of Canada in 1867, New Brunswick entered the federation. Population in 1911, 351,889.

New Brunswick, N. J., the county-seat of Middlesex co., 30 mi. s. w. of New York City, on the Raritan River and the Delaware & Raritan Canal and on the Pennsylvania and the Raritan River railroads. It is the seat of Rutgers College, of the Theological Seminary of the Dutch Reformed Church and of the state agricultural and mechanical college. The city also has a public library, the Sage Library, Saint Agnes Academy and homes for orphans and aged. The place was settled as Prigmore's Swamp in 1681 and was known as Inion's Ferry from 1697 to 1714, when it was named in honor of the House of Brunswick. It was chartered as a city in 1784. In the Revolution it was the scene of numerous conflicts and was held by the British during the winter of 1776-1777. Population in 1910, 23,388.

Newburgh, N. Y., a city in Orange co., 60 mi. n. of New York City, on the Hudson River, 5 mi. above the Highlands, and on the Erie, the West Shore, the New York Central, with which it is connected by ferry, and other railroads. There is considerable trade in coal and agricultural and dairy products. The manufactures include cotton, woolens, silks, paper, hats, carpets, ships, leather and other articles. The municipality has a public library, a park, Saint Luke's Home and Hospital, a home for the friendless and a home for children. Hasbrouck House, occupied by Washington for a time during the Revolution, is now used as a museum for war relics. The revolutionary army was disbanded here, and a large stone structure, known as the Tower of Victory, has been erected by the Federal and state governments to commemorate the successful termination of the war. The place was settled by German Lutherans in 1709, was made a village in 1800 and was chartered as a city in 1865. Population in 1910, 27,805.

Newburgh Addresses, several anonymous letters published at Newburgh-on-the-Hudson, while the Continental army was in camp there,

Newburyport

after the close of the Revolutionary War. They were the result of a widespread feeling of discontent, on account of the failure of Congress to provide for the payment of the soldiers. The addresses called for a meeting of officers to consider a means of enforcing their claims, urged the army not to disband until these were satisfied and to appeal "from the justice to the fears of the government." Through Washington's influence, the meeting was controlled in the interests of the government, and later Congress made a satisfactory settlement with the army.

Newburyport, MASS., one of the county-seats of Essex co., 37 mi. n. e. of Boston, on the Merrimac River and on the Boston & Maine railroad. The city has a good harbor, ships considerable coal and contains manufactures of boots, shoes, cotton cloth, silverware, machinery, hats and other articles. In the days of wooden boats, there were large shipyards here, and some small boats are even yet constructed. There is a public library, a marine museum, the Putnam Free School, Anna Jaques Hospital, the Dexter House and homes for old ladies and children. Other places of interest are the house in which William Lloyd Garrison was born; the Old South Church, which contains the remains of George Whitefield; Washington Park, and an old chain suspension bridge, built in 1792. The place was settled in 1635, was incorporated as a separate town in 1764 and was chartered as a city in 1851. Population in 1910, 14,949.

New Cal'edonia, an island in the Pacific, situated about 850 mi. from Australia and about the same distance from New Guinea. Its area is 7650 square miles. The interior of the island is mountainous, and the surface is largely covered with luxuriant forests. Copper and cobalt are exported in considerable quantities. Wheat, maize, coffee, cocoanuts and vanilla are the chief products. The island was discovered by Captain Cook in 1774. Ten years later a penal colony was founded. Population in 1901, 51,415 of whom over 10,000 were convicts.

Newcastle, *new'kas'l*, a city and shipping port of New South Wales, on the Hunter River, 102 mi. n. of Sydney, with which it is connected by rail. It is the chief port for the northern region of New South Wales and is an important coaling station. The trade in coal, wool and frozen meats is considerable, and there are manufactures of carriages, boots and other articles. Newcastle is the seat of a United States consul. Population in 1911, 55,380.

New Castle, IND., the county-seat of Henry

Newcomb

co., 41 mi. s. e. of Indianapolis, on the Lake Erie & Western, the Big Four and other railroads. The leading manufactures include bridge work, sheet iron, steel, furniture and numerous other articles. Population in 1910, 9446.

Newcastle, PA., the county-seat of Lawrence co., 50 mi. n. w. of Pittsburg, at the confluence of the Shenango and the Neshannock rivers, on the Pennsylvania, the Erie, the Baltimore & Ohio and other railroads. The city is an important railroad center in an agricultural district, which also contains deposits of coal, limestone, sandstone, fire clay and iron ore. There are extensive manufactures of iron, glass, brick, nails, machinery, paper and other articles. Cascade Park is a popular resort. The Y. M. C. A. maintains a public library. The place was settled in 1812 and was chartered as a city in 1869. Population in 1910, 36,280.

Newcastle-upon-Tyne, a river port, parliamentary borough, municipal county and episcopal city of England, in the County of Northumberland, about 60 mi. n. e. of Liverpool. The most noteworthy buildings of the city are the Church of Saint Nicholas, the guildhall, the townhall and the jail. Schools of medicine, science, mechanics and mining engineering are located in Newcastle, which also possesses a natural history museum and a public library of about 120,000 volumes. Owing to the rich mineral products of the neighborhood, Newcastle has attained a first position among the centers of British enterprise. Some of the more important of its industries are shipbuilding and the manufacture of locomotive and marine engines, cannon, shot, tools, hemp and wire ropes, cables, anchors and sails. Situated in the midst of one of the largest coal fields in England, it exports immense quantities of coal. Population in 1911, 266,603.

Newcomb, *nu'kom*, SIMON (1835-1909), an American astronomer and mathematician, born in Nova Scotia. He came to the United States when he was thirteen years old. In 1858 he graduated from the Lawrence Scientific School at Harvard, and in 1861 he was appointed professor of mathematics in the United States navy and assigned to duty at the Naval Observatory. He was secretary of the commission which observed the transit of Venus in 1874 and in 1882, and he observed the latter at the Cape of Good Hope. In addition to this he directed the observations of several eclipses, beginning in 1860. In 1897, at the age of 62, he retired from the navy and afterwards devoted himself to

scientific pursuits. He was editor of the *American Journal of Mathematics*, professor in Johns Hopkins University and a member of numerous royal academies and scientific associations of Europe and America. In many of the American associations he has held the position of president or other important offices, and in 1904 he was president of the International Congress of Arts and Sciences which convened at Saint Louis. In 1874 the Royal Astronomical Society gave him their medal, in 1878 he received the Huygens medal, in 1890 the Copley medal of the Royal Society and in 1898 the Bruce medal of the Astronomical Society of the Pacific. Other honors and distinctions have been conferred upon him, and he is generally recognized as the leading authority in his department.

His lesser publications are numerous in many scientific journals. Among his large and important scientific works are *An Investigation of the Orbit of Neptune*, *Researches on the Motion of the Moon* and *Measure of the Velocity of Light*. Besides these, he has written a number of books of a popular nature which have much enhanced his reputation among general readers. Among these are his *Popular Astronomy*, *School Astronomy*, *The Stars*, *Astronomy for Everybody* and *Reminiscences of an Astronomer*.

Newcom'en, THOMAS (1663-1729), an English locksmith, born at Dartmouth, in Devonshire. The merit of first applying the steam engine to practical purposes is due to Newcomen, who, in conjunction with Captain Savery and John Cowley, took out a patent in 1705.

New Decatur, ALA., a city of Morgan co., on the Louisville & Nashville Railroad, 90 mi. n. w. of Birmingham. It is an important industrial center, especially for iron manufacturing. It has cotton compresses, cotton-seed oil mills, wagon works, spoke and handle factories and other industries. New Decatur was settled in 1887 and was incorporated in 1889. Population in 1910, 6118.

New England Confed'era'tion, a union formed by the colonies of Plymouth, Massachusetts Bay, Connecticut and New Haven in 1643, under the title *United Colonies of New England*. Its purpose was to secure united action against the indians, the Dutch, the French and, probably, the mother country. During the first twenty years of the union, the confederation was an important force in the colonies, but after that time it rapidly declined, owing to factional dis-

putes and the weakness of its constitution, and it went out of existence in 1684.

Newfoundland, *nu'fund land*, a large island of British North America, in the Atlantic Ocean at the mouth of the Gulf of Saint Lawrence. Its area is estimated at about 40,200 square miles. Its irregular coast affords numerous safe and sheltered harbors. The largest rivers are Humber River, the River of Exploits, the Gander, the Terra Nova and the Salmon. The largest lakes are Grand and Red Indian lakes. The interior of the island has never been fully explored, but it seems to be a rough plateau, much broken up by rivers and covered with a vegetation which is by no means luxuriant. The minerals comprise coal, gypsum, lead, nickel, silver, iron and copper, this last the most important of the minerals. The wild animals are the caribou, or reindeer; the bear, the wolf, the hare, the beaver, the marten and the wild cat. The Newfoundland dog is the only animal peculiar to the island. The famous Banks of Newfoundland swarm with almost every variety of fish, particularly cod. The cod fishing is carried on from June to November and may be said, with the other fisheries of seal, lobster, herring and salmon, to form the staple occupation of the inhabitants. Codfish is by far the largest export. The trade is chiefly with England, Canada and the United States.

The affairs of the colony are administered by a governor, appointed by the British crown; an executive council of nine members; a legislative council of fifteen members, nominated by the governor; and a house of assembly of thirty-six representatives. The religion is chiefly divided between the Anglican, the Roman Catholic and the Wesleyan bodies, and the educational system is almost entirely denominational.

It is supposed that Newfoundland was discovered about the year 1000 by the Northmen. It was rediscovered by John Cabot in 1497, and in the following century the English took possession of the island. A struggle for supremacy took place between the English and the French, and this interfered with the establishment of permanent settlements on the island. In 1713 Newfoundland and its dependencies were declared by the Treaty of Utrecht to belong wholly to Great Britain, the French reserving a right to fish on certain parts of the coast. Responsible government was granted in 1833. The only noteworthy town on the island is Saint John's, the capital. Population of the island in 1911, 238,670.

Newfoundland Dog, a large, handsome dog, introduced from the island of Newfoundland. It is usually black or black and white in color, with large, drooping ears and bushy tail, and in general appearance it is very imposing. It is a splendid water dog, takes to the sea at an early



NEWFOUNDLAND DOG

age and has often saved the lives of human beings in danger of drowning. In Newfoundland these dogs are used as beasts of burden and haul wood and provisions on sledges. On account of its great size, its intelligence and its bravery, the Newfoundland dog makes a fine watch dog. It is of a mild disposition, and very friendly with children.

Newgate, a celebrated prison in London, so named because it was located at the new gate of the city. It was probably built at the beginning of the twelfth century. It was destroyed and rebuilt a number of times and has always been of historic interest, because of the many eminent men that were confined in it for political or religious reasons. The building was demolished in 1902.

New Guinea, *gin'ee*, or *Pap'ua*, a large island of the Eastern Archipelago, situated north of Australia, from which it is separated by the Torres Strait. Its area is estimated at 313,183 square miles, and it is, next to Greenland, the largest island on the globe. The interior has never been thoroughly explored, but it is known that it is to a large extent mountainous. The largest river is the Fly, which is about 620 miles long and is navigable by steam launches for 500 miles. There are several other navigable rivers, of which, however, little is known as yet. The climate is hot and unhealthy in the lower altitudes, but is usually agreeable at points above 3500 feet.

In the south of the island are found great forests of cypress, cedar and ebony, and the cultivated plants include rice, sugar, maize, yams,

bananas and breadfruit, coffee and tobacco. Commercially the island is as yet of small importance, almost the entire trade being between British New Guinea and Queensland, New South Wales.

Politically the island is divided into British New Guinea (estimated area, 90,540 square miles), Kaiser Wilhelmsland (estimated area, 70,843 square miles) and Dutch New Guinea (estimated area, 151,800 square miles). The British territory is governed by an administrator and a legislative council, and much is being done to advance the trade of the territory and to improve the natives. A German company, known as the German New Guinea Company, has as its object the development of the resources of Kaiser Wilhelmsland, but as yet the territory has been by no means made to pay expenses. The Dutch have done little or nothing for their portion of the island. Population of the entire island, estimated at about 750,000.

The discovery of New Guinea was made by the Portuguese in the sixteenth century, but little attention was paid to it until recently. The naturalists were the first to make incursions into the interior, and the missionaries came next. Germany and the Australian colonies also began to take an interest in New Guinea, and the latter urged the home government to annex the eastern portion of the island, the western part having long been recognized as Dutch territory. The final division of the island between Great Britain, Germany and Holland was settled in 1885.

New Hampshire, the **GRANITE STATE**, one of the New England states, bounded on the n. by the Province of Quebec, on the e. by Maine and the Atlantic Ocean, on the s. by Massachusetts and on the w. by Vermont, from which it is separated by the Connecticut River. The greatest length is 178 mi., the greatest width, 100 mi.; the area is 9341 sq. mi., of which 310 sq. mi., are water surface. Population in 1910, 430,572.

SURFACE AND DRAINAGE. The state is rugged and mountainous in the northern part, but the southern part is composed of broad valleys and low hills. The White Mountains occupy the north central part of the state; they cover an area of about 1400 square miles and constitute its most striking physical feature. They are a part of the Appalachian system and are divided by the valleys of the Saco and the Ammonoosuc rivers, whose valleys form the famous "Notch," into two ranges, known respectively as the White and Franconia ranges (see **WHITE MOUNTAINS**). Mount Washington, which is 6293 feet high,

ranks fourth in point of height among the peaks of the Appalachian system. There are a number of peaks whose bare, rocky summits rise above the tree line and so reflect the sunlight as to give them the appearance of snow-capped mountains. It is from this peculiarity that they received the name "White Hills," later changed to White Mountains. The bases of these mountains are heavily wooded. They abound in deep valleys and narrow ravines, through which flow rushing streams. Some of these gorges are bounded by precipitous cliffs, some of which are more than a thousand feet high. The most remarkable of these is the cliff overlooking a small lake in the Franconia Range, and containing the celebrated projection known as *The Old Man of the Mountains*. This is a profile formed by projecting rocks and measuring more than eighty feet from forehead to chin, but bearing a striking resemblance to a human face. It is supposed that this profile was the foundation for Hawthorne's allegory *The Great Stone Face*, though the valley does not exist as he describes it.

The Connecticut and its tributaries drain the western and northern regions, and the Merrimac and Piscataqua drain the southern and south-eastern portions. The banks of the Merrimac are lined with manufactories, and this river is said to turn more spindles than any other in the world. The Piscataqua remains open from Dover to its mouth the entire year and forms the only harbor in the state. Numerous small lakes, noted for their beauty, are scattered over the state. Lake Winnepesaukee, in the south central part, the largest, is 19 miles long and 8.25 miles wide and contains 264 islands.

CLIMATE. New Hampshire has a typical New England climate. The winters are severe, and in the northern half snow usually falls to a great depth. The summers are mild and pleasant. The mean annual temperature at Concord is 48°. The annual rainfall, including snow, is 45 inches.

MINERAL RESOURCES. Gold, silver, copper, lead, zinc and other ores are found, but in such small quantities and so inaccessible that they cannot be mined with profit. Granite, soapstone and mica are quarried in large quantities. New Hampshire produces nearly four-fifths of the output of mica of the United States. Slate, clay, porphyry and limestone are also found.

AGRICULTURE. In general, the soil is poor, but along the Connecticut and in the valleys of other streams good farms are found. Much of the state is covered with forests, from which

most of the valuable timber has been cut. Where these forest areas have been cleared, especially in the northern portion of the state, the soil yields good crops. The farms are small and diversified farming is general. Dairy products, live stock, poultry, wool, oats, hay and potatoes are the chief agricultural products.

MANUFACTURES. Manufacturing is the leading industry. It is estimated that there are 2000 water powers in the state, and most of them are employed. The leading manufactories are in the southern part, where abundant water power, proximity to good markets and excellent shipping facilities are greatly to their advantage. The leading manufactures are cotton goods, boots and shoes, woolen goods, lumber and paper and wood pulp. Manchester, Nashua and Berlin are the chief manufacturing centers.

TRANSPORTATION. Numerous lines of railway traverse the valleys, and nearly every town of importance has ready access to one or more of these lines. All the railroads in the state are controlled by one of the following systems: the Boston & Maine, the Maine Central and the Grand Trunk. The Mount Washington railway makes an ascent of 3625 feet in 2¾ miles, and it is the first of its kind ever constructed. It is operated during the summer for the benefit of tourists.

GOVERNMENT. The legislature consists of a senate of 24 members, distributed among 24 senatorial districts. The house of representatives consists of members apportioned according to population, all towns, cities and wards having 600 inhabitants being entitled to one representative, while districts having less than 600 inhabitants are entitled to a representative for a part of the legislative term corresponding to the ratio of their population to 600. The members of both houses are elected for two years. The executive department consists of the governor and a council of five members, chosen by popular vote, and a secretary of state, a treasurer and a commissary general, chosen by joint ballot of the senate and house of representatives. The judicial department consists of one supreme court, with a chief justice and four associate justices, and a superior court, with a chief justice and four associate justices. The justices are appointed by the governor and confirmed by the council. Each county has a probate court, and justices of the supreme court hold courts in the different counties during the year.

EDUCATION. There is a good system of common schools, but, being one of the older

states, New Hampshire did not receive the benefit of a school fund from the sale of public lands. Consequently, nearly all of the fund for the support of public schools has to be raised by local taxation. The average length of the term in the rural schools is about seven and a half months. All towns and cities have excellent systems of graded schools. The system of education is in charge of a superintendent of public instruction, appointed by the governor and confirmed by the council. State normal schools are located at Plymouth and Keene, and the state agricultural college is at Durham. Dartmouth College at Hanover is the most important educational institution and one of the leading colleges of the country (See DARTMOUTH COLLEGE). Saint Anselm's College at Manchester is the leading Roman Catholic school.

INSTITUTIONS. There is a school for feeble-minded children at Laconia, an orphans' home at Franklin, a hospital for the insane at Concord, and the penal institutions include the state's prison at Concord and the industrial school at Manchester.

CITIES. The chief cities are Concord, the capital; Manchester, Nashua, Berlin, Dover, Portsmouth, Keene, Laconia, Rochester, Somersworth and Franklin.

HISTORY. New Hampshire was first settled about 1623 by fishermen from Massachusetts, in the neighborhood of Dover and Portsmouth. It was granted to George Mason (See MAINE), but his claims were afterwards silenced, and the colony voluntarily united with Massachusetts and remained so with slight interruptions until 1741. New Hampshire took a leading part in the pre-Revolutionary discussion and furnished more than its quota of soldiers to the Continental armies. It was among the first states to adopt an independent constitution, and its ratification of the Federal Constitution in 1788 assured the final adoption of that instrument. Before and during the Civil War, the sentiment of the state was strongly anti-slavery, and it furnished its full quota of troops to the Union armies. It has since been stanchly Republican in politics.

New Haven, CONN., a city and the county-seat of New Haven co., the largest city of the state, at the head of New Haven Bay, 4 mi. from Long Island Sound, on the New York, New Haven & Hartford railroad, 73 mi. e. n. e. of New York and 36 mi. from Hartford. Its area is about 23 square miles, and it is built on a level plain, which is bordered on the east and west by the Quinnipiac and the West rivers. Of

the two spurs of the enclosing line of hills, East Rock and West Rock, the former has been made into a picturesque park. At the summit of the rock stands a soldiers' and sailors' monument. The entire park system includes almost 1200 acres. One of the most striking characteristics of New Haven is the great number of magnificent elm trees which border many of the chief streets and which have given to the town its popular name of the "City of Elms." The "Old Green," the center of the city as originally laid out, is surrounded by these great trees.

At New Haven is located Yale University (See YALE UNIVERSITY), with its numerous buildings and schools. The other educational institutions include the Hopkins Grammar School, Hillhouse High School, Boardman Manual Training School and a state normal school. Of the charitable institutions, the most noteworthy are the New Haven Hospital, the Grace Hospital, the Saint Francis Roman Catholic Orphan Asylum and the New Haven Orphan Asylum. The city possesses a public library of more than 52,000 volumes, as well as a number of learned societies. There are in the city about seventy churches, some of which were built at the very beginning of the nineteenth century. In the old burying ground in Grove Street are the graves of Noah Webster, Theodore Winthrop, Timothy Dwight, Eli Whitney, Samuel F. B. Morse and other distinguished men of the city.

Until the middle of the nineteenth century, New Haven was a ship-building center of importance, but this industry has considerably declined. The city has a fine harbor and a considerable coastwise and internal trade, as well as a large foreign commerce, both direct and through New York. New Haven is one of the important industrial centers of Connecticut and has manufactures of firearms, edge tools, wire goods, carriages, clocks, engines and boilers, corsets, musical instruments and paper. There are also planing mills and slaughtering and packing houses. In 1638 a company of Puritans, under Theophilus Eaton and the Reverend John Davenport, settled at the place, called by the Indians Quinnipiac. Two years later the town was given the name of New Haven, and it became the capital of the independent "New Haven Colony." In 1665 this was united with the Connecticut colony, of which in 1701 it was made a joint capital with Hartford, retaining this position until 1873. A force of British took the town on July 5, 1779, about 70 British and 29 Americans losing their lives in the conflict. In 1784 New Haven was

incorporated as a city. Population in 1910, 133,605.

New Hebrides, *heb'ri deez*, a long chain of volcanic islands in the Pacific Ocean, lying north of New Caledonia and west of the Fiji Islands. Their total area is about 5100 square miles. They are fertile, and produce cocoanuts, breadfruits, bananas, pineapples, oranges and sandalwood. The climate is unhealthful, even for the natives. The population is about 50,000 and is made up mostly of savages.

New Iberia, LA., the parish-seat of Iberia parish, 125 mi. w. of New Orleans, on the Bayou Teche, at the head of navigation, and on the Southern Pacific railroad. The town is in an agricultural district, producing sugar cane, cotton, rice, corn, potatoes, small fruits and vegetables. The industrial establishments include lumber mills, machine shops, knitting mills, shipyards, foundries, sash and blind and other factories. A part of the scene of Longfellow's *Evangeline* was laid in this section. The city has a Federal building, a high school, a library, a fine town hall and a market. Population in 1910, 7499.

New Ireland. See NEUMECKLENBURG.

New Jersey, *jur'zy*, one of the Middle Atlantic states, bounded on the n. by New York, on the e. by New York and the Atlantic Ocean, on the s. by Delaware Bay and on the w. by Pennsylvania, from which it is separated by the Delaware River. It is separated from New York on the e. by the Hudson River and Staten Island Sound. The extreme length of the state is 167 mi.; its average width, 50 mi.; its area, 8224 sq. mi., of which 710 sq. mi. are water. Population in 1910, 2,537,167.

SURFACE AND DRAINAGE. New Jersey is divided into four physiographical regions, three of which are in the northern part, and extend across the state in a northeast southeast direction. The first of these belts is bounded on the west by the Kittatinny Mountains, a continuation of the Blue Mountains in Pennsylvania. The cut through these mountains made by the Delaware River forms the famous Delaware Water Gap, noted far and wide for the beauty of its scenery (See DELAWARE WATER GAP). The mountains of this range do not exceed 1800 feet in altitude. To the east of the mountains lies the Kittatinny valley, an extension of the Great Appalachian valley, and containing many fertile and highly cultivated farms. The second region, known as the Highland Belt, is a succession of plateau-like masses, having an altitude of 1200

to 1400 feet. Following this is the Piedmont plain, nearly as wide as the other two regions combined, having a variety of surface and containing a number of bold ridges, the most famous of which is the Palisades (See PALISADES). The plain descends by gentle undulations to sea level on the coast. The fourth region includes all that part of the state lying south of a line running from Newark Bay to Trenton. This is a belted coastal plain, nowhere more than 400 feet in altitude and sloping gently to sea level.

The western part of the state is drained by the Delaware River, into which flow numerous short tributaries. The rivers flowing into the Atlantic in the southern part of the state are characterized by broad estuaries. To the north, the Raritan flows into Raritan Bay, and in the northeastern section are the Passaic and the Hackensack, flowing into Newark Bay.

CLIMATE. New Jersey has a mild temperate climate, varying considerably between the northern and southern parts of the state. In the eastern part of the state the temperature is modified by sea breezes, which, meeting land breezes, often produce oppressive humidity. The mean annual temperature at Atlantic City is about 52°, and the annual rainfall is 49 inches.

MINERAL RESOURCES. There are quite extensive beds of iron ore in the highland belt of the state, and these have been worked for many years, though the opening of more extensive iron regions around the Great Lakes has lessened the relative importance of the production of the New Jersey mines. Large quantities of zinc ore are also obtained in the state, and in the production of zinc it is second only to Missouri. Among other minerals of importance are limestone and clays suitable for brick and pottery. Large quantities of rock suitable for the manufacture of Portland cement are also found, and this product is extensively manufactured. Another important mineral product is pottery clay, in the production of which New Jersey ranks second among the states. In the southern part of the state, sand suitable for glass-making is found.

FISHERIES. Its extensive coast line makes New Jersey a favorable location for fishing industries. Many are engaged in oyster farming, and clams, shad, bluefish, cod and menhaden are taken in large quantities. The canning of small menhaden, under the name of sardines, constitutes an important industry in some localities.

AGRICULTURE. The soil of the state is

generally fertile and easily tilled. There is an abundance of moisture, and the climate is suitable to the production of fruits, vegetables and cereals. Because of the nearness to New York, Philadelphia and Baltimore, all localities have the advantage of good markets, and the raising of fruit, vegetables and other garden products is an important branch of the agricultural industry. Large quantities of tomatoes and sweet potatoes are produced. Among the cereals, corn, oats, rye and wheat are the most important. In those areas containing good grazing land, dairying is practiced to some extent, though it cannot be considered one of the leading agricultural industries. Among the orchard fruits, apples and peaches are produced in largest quantities. New Jersey is known for its cranberries, which are grown on the marsh lands along the coast, the state producing fully one-half of the entire crop of the country.

MANUFACTURES. Considering its size, New Jersey is one of the leading manufacturing states. Most of these industries are located in the northern part of the state. Those of the greatest importance are the manufactures of silk goods, cotton and woolen goods, iron and steel products, machinery, including sewing machines, pottery, in which the state is second in the Union, terra cotta and tile. In many of the cities there are extensive works for the manufacture of chemicals, distilled liquors and tobacco products. Other localities are also given to the manufacture of jewelry, and glass is manufactured to some extent in the southern part of the state.

TRANSPORTATION AND COMMERCE. New Jersey is remarkably well supplied with railroads, since, in addition to the local roads, several of the trunk lines running to New York pass through the state. There are also two important canals, the Morris Canal, leading from Jersey City to the Delaware River at Philipsburg, and the Delaware-Raritan Canal, connecting the Delaware River with Raritan Bay. Both of these are extensively used in the transportation of coal. The Delaware is navigable for ocean steamers as far as Philadelphia and for other boats to Trenton. The coast contains several good harbors, so that the state is provided with water transportation.

The commerce consists of the export of fruits, vegetables and manufactured articles and the importation of raw materials and manufactured food products. Much of the commerce between

New York, Philadelphia and the West passes through the northern part of the state.

GOVERNMENT. The legislature is composed of 21 senators, one from each county, elected for three years, and an assembly of not more than 60 members, apportioned among the counties according to population, and elected for one year. The legislature meets annually. The executive power is vested in a governor, elected for three years. The chief state officers are a treasurer and a comptroller, elected for three years by the senate and assembly in joint session. A secretary of state, an attorney-general, an adjutant general, a commissioner of banking and insurance, a clerk in chancery, a clerk of the supreme court and a superintendent of public instruction are appointed by the governor, with the approval of the senate.

The judicial power consists of the court of errors and appeals, court of chancery, supreme court, circuit court, prerogative court, impeachment court, court of pardons and certain inferior courts, namely, common pleas, orphans' court, justice court, city district court and criminal court. The judges and chancellor are appointed by the governor, the vice-chancellors by the chancellor. The terms of office of the chancellor and supreme court judges are seven years. Those of the other judges are for varying lengths of time.

The court of errors and appeals consists of the chancellor, the justice of the supreme court and six other judges especially appointed. The supreme court consists of a chief justice and eight associate justices.

EDUCATION. The public schools are under the management of a state board of education consisting of two members from each congressional district, 20 in all, appointed by the governor and confirmed by the senate, for the term of five years. Their secretary *ex-officio* is the state superintendent, who sits with them, without a vote. The latter is appointed by the governor for a term of five years. This board has control of the normal school, the school for the deaf and the various other schools known as state schools. They make rules for the enforcing of the school laws of the state, appoint a state high school inspector and county superintendents, regulate teachers' institutes, decide appeals and make rules for the examination of teachers. There are also city, borough and township boards, with their supervisors, and the powers usual to such boards. The schools are graded into high, grammar and primary, and

are kept open for an average term of over nine months. There is a state normal school at Trenton, and one is about to be erected at Upper Montclair. The state agricultural and scientific school is connected with Rutgers College, New Brunswick. Other institutions of importance are Princeton University, Princeton; Stevens Institute of Technology, Hoboken; Seton Hall College, South Orange; Centenary Collegiate Institute, Hackettstown; Blair Presbyterian Academy, Blairstown; Pennington Seminary, Pennington; Lawrenceville School, Lawrenceville; Peddie Institute, Hightstown, and Drew Theological Seminary, Madison.

INSTITUTIONS. The following are the principal public institutions: The school for the deaf at Trenton, the state prison at Trenton, the reformatory at Rahway, a home for boys at Jamesburg, a home for girls at Trenton, a home for disabled soldiers at Kearny, a home for disabled soldiers, sailors, marines and their wives at Vineland, state hospitals for the insane at Trenton and Morristown, village for epileptics at Skillman and homes for feeble-minded women and children at Vineland.

CITIES. The chief cities are Trenton, the capital; Jersey City, Camden, Elizabeth, Hoboken, Newark, New Brunswick, Paterson and Orange, each of which is described under its title.

HISTORY. The first settlement in New Jersey was made by the Dutch, about 1617. Thereafter it was settled successively by the Swedes and the English, who, with the Dutch, maintained a continuous warfare for the control of the territory until 1664, when the English gained control. It was granted by Charles II to the duke of York and by him to lords Berkeley and Carteret. By them it was divided into two territories, East and West Jersey, and in 1682 an organization, chiefly of Quakers under William Penn, bought East Jersey, but later relinquished their rights, and the two territories were reunited in 1702. During the French and Indian wars, New Jersey loyally supported the English cause, but in the Revolution it contributed, besides its militia, more than ten thousand men to the Continental army. It was the scene of some of the most important campaigns of that war and suffered heavily. In the constitutional convention, the delegates of New Jersey steadily opposed the establishment of a strong central government, the so-called *New Jersey plan* contemplating a union that was to have little authority over the states.

However, it was among the first to ratify the Federal Constitution (December, 1787). In the slavery struggle the state was generally hostile to the institution and furnished its full quota of men to the Union armies. The chief issues in the state politics after the war have been those connected with the taxation and control of corporations. The state has generally been Republican in national politics. Consult Lee's *New Jersey as a Colony and as a State*.

New'lands, FRANCIS GRIFFITH (1848-), an American politician, born at Natchez, Miss. He attended Yale College and the Columbian College Law School at Washington and began the practice of law at San Francisco, where he remained until 1888. In that year he removed to Nevada, was elected for five successive terms to the lower house of Congress. In 1903 he was chosen to the Senate, where he was the author and champion of an important irrigation bill. He was reelected in 1909.

New London, *lun'don*, CONN., one of the county-seats of New London co., 50 mi. e. of New Haven, on the New York, New Haven & Hartford and the Central Vermont railroads, and on the Thames River, about 3 mi. above Long Island Sound. It is a beautiful residence place and a popular summer resort. There are regular steamboats to New York, and the city has a good harbor, with forts Trumbull and Griswold at the entrance. The place was once famous as a whaling port and is still interested in fishing. The various industrial establishments include machine shops, foundries, printing-press works, silk and woolen mills, shipyards and furniture and other factories. The city has several parks, a handsome public library and the library of the county historical society. The place was settled in 1646 by John Winthrop and was known as Naumeag until 1658. In 1781 Benedict Arnold with a large British force, assisted by a fleet, attacked the city, killed a number of the inhabitants and burned most of the wharves and stores. A shaft 127 feet high has been erected as a memorial to the victims. Other places of historical interest are the Hempstead House, one of the oldest in the state; the old town mill, erected in 1646 and still in operation, and the little school in which Nathan Hale was teacher. Population in 1910, 19,659.

New'man, JOHN HENRY, Cardinal (1801-1890), a Catholic divine, born in London and educated at Ealing and Trinity College, Oxford, where he graduated with classical honors in 1820.

He was elected fellow of Oriel College. He was vice-president of Saint Alban's Hall (1825-1826) under Doctor (afterward Archbishop) Whately,



JOHN HENRY NEWMAN

and later became tutor in his own college. He was vicar of Saint Mary's, where he gained great power over the people by his sermons, and was later chaplain of Littlemore (1828-1843). During this last period he took part with Keble and Pusey in originating the Oxford movement; was a leader in the propaganda of High Church doctrines and contributed largely to the celebrated *Tracts for the Times*. The last of these, on the elasticity of the Thirty-nine Articles, was censured by the university authorities and was followed by Newman's resignation of his offices in 1843 and secession to the Church of Rome in 1845. Newman was ordained a priest of that Church and became head of the oratory of Saint Philip Neri at Birmingham, rector of the Roman Catholic University of Dublin (1854-1858) and principal of the Roman Catholic school at Edgbaston. In 1879 he was created a cardinal. He wrote some remarkable works sustaining the doctrines of the Church of Rome, particularly the *Apologia pro Vita sua* (1834) and the reply to Mr. Gladstone (1875) on the *Vatican Decrees*. He is the author of the well-known hymn, popular in all denominations, *Lead, Kindly Light*.

New Mexico, a state in the southwestern part of the United States, bounded on the n. by Colorado, on the e. by Oklahoma and Texas, on the s. by Texas and Mexico and on the w. by

Arizona. It has an area of 122,634 square miles. Population in 1910, 327,301.

SURFACE AND DRAINAGE. The state occupies an elevated plateau having its greatest altitude in the west and northwest, and sloping gradually towards the south and southeast. In the Pecos valley near the southern boundary is a small area less than 3000 feet in altitude, but with this exception the plateau is above 3000 feet. This plateau is divided into distinctly marked surface areas, which extend across the state from north to south. Beginning on the east, the first of these areas is a region belonging to the Great Central Plain. In the southeastern part of the state this region slopes to the level and arid plateau known as the Llano Estacado, or Staked Plain. West of this region is the Pecos valley, which is the lowest land in the state. From this valley the surface rises to the westward until it meets the Front Range of the Rocky Mountains. West of this range is the valley of the Rio Grande, which traverses the state from north to south, and west of this is the great broad plateau which forms the Continental Divide. In the central part of the state are a number of plains covered with grass, lying between isolated groups and mesas of the Front Range. Towards the south these plains are succeeded by barren valleys containing lava beds and salt marshes. There are lofty peaks within the state, the most prominent being Cerro Blanco, 14,269 feet; Truchas, 13,150 feet; Taos, 13,145 feet; Costilla, 12,634 feet; Baldy, 12,623 feet; Lake, 12,380 feet and Mora, 12,020 feet.

New Mexico, for a region with a small amount of rainfall, has a large number of rivers. Many of them disappear in the dry season, and none are navigable. The Rio Grande passes completely through the center of the state from north to south and receives many tributaries. The northeastern part of the state is drained by the Red River and its numerous branches. The Pecos rises northeast of Santa Fe and flows south across the Texas line, finally joining the Rio Grande. In the northwest is the Rio San Juan. In the central west are the headwaters of the Little Colorado, and in the southwest are those of the Gila.

CLIMATE. The delightful and healthful air of this territory has given it repute as a health resort. The mean temperature at Santa Fe is 48°, the extremes being from 1° below zero to 70° above zero. The average rainfall is from 15 to 17 inches, and irrigation and dry farming are successfully used in many parts of the state.

New Mexico

AGRICULTURE. The greater portion of New Mexico is pasture land, and stock raising, next to mining, is the chief industry. Wherever there is sufficient water, either in streams or in springs, to supply the wants of animals, the grass is amply sufficient to support either cattle or sheep. New Mexico, with over 3,000,000 sheep, is prominent in this industry. The supply of timber is small, only the higher sections being timbered, and even there not densely. Pine in the mountains, scrub oak and juniper in the lower sections, willow and cottonwood along the river banks are common. Large crops of grain and most kinds of vegetables are produced. Potatoes succeed best in the mountainous regions. The Taos valley is an exceptionally fine wheat country. It is as a fruit-producing region, however, that a large portion of the irrigated land of the state especially excels. The area of fruit and vine culture is being yearly extended. Peaches, plums and apricots come to perfection in the north, and pears, apples, quinces, cherries and other fruits are thrifty throughout the middle and southern sections. Grapes flourish from Bernalillo to El Paso and in some favored spots, like La Joya, farther north.

MINERAL RESOURCES. Mining operations have been carried on in New Mexico since the discovery of this region by the Spaniards. Nearly all of the mountainous portions of the state are rich in minerals. Those mined to the greatest extent are coal, gold and silver. Anthracite, bituminous coal and lignite are found, and the yearly output is about 2,500,000 tons. The mining of gold ranks next in importance, and this is followed by silver. Considerable copper is also produced, and in some parts of the state emeralds, turquoises and other precious stones are found in paying quantities.

MANUFACTURES. The manufactures are limited in extent, but since 1890 they have rapidly increased in number and importance. Most of the industries are connected with the smelting and refining of ore and the construction and repairing of cars and locomotives for the railway lines passing through the state. There are a number of flour mills in the state, some sawmills and numerous carpentry and repair shops in various localities to meet the demands of the surrounding population. The production of large quantities of wool has led to the establishing of several plants for wool-scouring. There are also a number of beet sugar factories, distilleries and establishments for canning fruit.

New Mexico

TRANSPORTATION. The Atchison, Topeka & Santa Fé Railway system enters the state in the northeastern section and extends across it from north to south, following, through a large part of the way, the valley of the Rio Grande River. The western branch of this line extends westward to the Pacific coast and east to Texas and the Gulf of Mexico. A branch of the Southern Pacific enters the state from the east and traverses it in a southwesterly direction to El Paso, thence westward into Arizona and then to the Pacific coast. Each of these lines has a number of spurs and cross lines, and the state is now fairly well-equipped with transportation facilities. In 1911 it had about 3000 miles of railways, and lines are being extended each year. Wagon roads lead from the various railway stations to neighboring towns and settlements.

EDUCATION. A large proportion of the inhabitants of New Mexico are of Spanish descent and speak the Spanish language. Until recently, the proportion of illiteracy among these people has been unusually large, but public schools are rapidly increasing in number and the length of their term is being extended, so that illiteracy is rapidly diminishing. The University of New Mexico is at Albuquerque, and the College of Agriculture and Mechanic Arts is at Mesilla Park; the school of mines is at Socorro; the normal schools are at Las Vegas and Silver City; a military institution is at Roswell. Besides these, there are a number of schools maintained by missions and various religious denominations, in which excellent work is done. The United States maintains a number of Indian schools within the state.

INSTITUTIONS. The school for the deaf is located at Santa Fé, the school for the blind, at Alamogordo, the hospital for the insane, at East Las Vegas and the state penitentiary, at Santa Fé.

CITIES. The chief cities are Santa Fé, the capital; Albuquerque and Las Vegas, each of which is described under its title.

HISTORY. Early Spanish adventurers penetrated this region in 1537, and in 1581 they named it New Mexico. The revolution which overthrew Spanish power in Mexico (1822) also gave freedom to New Mexico, and it was a province of Mexico until 1846. A small United States force under General Kearny captured Santa Fé in the Mexican War, gained control of the whole territory and secured its cession to the United States by the Treaty of Guadalupe Hidalgo, in 1848. New Mexico was organized

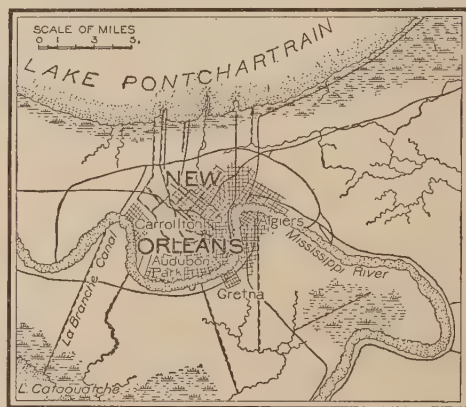
as a territory in 1851, though its area was changed from time to time by the Gadsden Purchase and by the separation of Arizona and Colorado. Numerous attempts to gain statehood were made, beginning in 1850. In June, 1910, Congress passed an act authorizing the framing of a state constitution. This constitution was ratified by the people of New Mexico on Jan. 21, 1911, and admission to the Union followed.

New Mexico, UNIVERSITY OF, a state university, located at Albuquerque and established by act of legislature in 1889. It was opened in 1892 and maintains a collegiate department, which includes both classic and scientific courses, and departments in music and art, a business school and normal and preparatory departments. It is co-educational, and women are admitted on equal terms with men. There are over 100 students, and the annual income from state appropriations is about \$14,000.

New Orleans, or'le anz, the chief city of Louisiana, is situated on the Mississippi River 107 mi. above its mouth, 960 mi. in a direct line s. w. of Washington, 915 mi. s. of Chicago and 639 mi. s. of Saint Louis. It is on the Illinois Central, the Southern Pacific, the Louisville & Nashville, the Texas & Pacific, the New Orleans & Northwestern and several other railroads. The official boundaries of the city include an area of nearly 200 square miles, but only about 41 square miles of this belong to the city proper. The original town was built on a bend in the river, which gave New Orleans the name *Crescent City*; since that time the city has been extended up the stream so that its line on the river now closely resembles the letter *S*. The streets are broad and well kept, and many of them have a profusion of shade trees, so that the city presents a very attractive appearance. Owing to the shape of the river frontage, the streets do not cross at right angles, and this necessitates the introduction of many short streets, which are more or less confusing to a stranger. Canal Street is the principal thoroughfare. For a portion of its length it contains a plat of grass 25 feet wide, and is shaded by numerous palms and other trees. This street divides the city into the old and new sections, or the French section, on the northeast, and the American section, on the southwest. Other streets similarly constructed and affording pleasant drives are Claiborne, Rampart, Esplanade and Saint Charles Avenue. Rampart and Esplanade streets are the principal

promenades in the French Quarter. Gravel Road and Saint Charles Avenue afford delightful drives through the residential portions and to Audubon Park.

The most noted parks are Audubon Park, which contains a large number of trees and an extensive conservatory, and City Park, whose area is 160 acres. In connection with these are a number of small parks and circles in the more densely populated portions of the city. The most noted is Jackson Square, formerly known as Place d'Armes, which is on the site of the first settlement made here by the French and which now contains an equestrian statue of General Jackson. Adjoining this are the old Spanish capitol, now the supreme court building, in which took place the ceremony transferring the Territory of Louisiana from France to the



United States. A short distance to the west is Lafayette Square, near which are the city hall and a number of other important public buildings. Beauregard Square, formerly Congo Square, was, previous to the Civil War, the favorite resort for slaves.

Among the most noted public buildings is the customhouse, begun in 1848 and constructed of Quincy granite, at a cost of nearly \$5,000,000. A portion of the building is occupied by the postoffice. A United States mint; the city hall, one of the most artistic buildings in the city; the Masonic Temple; Odd Fellows' Hall; Saint Charles Hotel; the Sugar Exchange; the Board of Trade; the Baldwin building; the Hennen building; the Howard Memorial Library; the Athenaeum building; the Young Men's Christian Association building, and the buildings of Tulane University, are also notable for architectural beauty. Among the most noted churches



CONFEDERATE MONUMENT, GREENWOOD CEMETERY, NEW ORLEANS

are the Cathedral of Saint Louis (Roman Catholic), the Church of the Immaculate Conception, the Church of Saint John the Baptist, Trinity church, First Presbyterian and the Temple Sinai, the Jewish synagogue. Charity Hospital, one of the largest in the United States, is maintained by the city. The chief educational institutions include Tulane University and the Sophia Newcomb Memorial College for women, a department of Tulane, Leland University, Straight University. New Orleans University and Southern University for colored students.

There is a marked contrast between the old section and the new section of the city. In the French Quarter the streets are narrow, the houses small and dingy, with small windows, sanded floors and iron balconies, which usually contain many potted plants. Within are often found articles of furniture that have been handed down from the earliest colonial times. The stores in this quarter are small and consist of shops for the trading of old bronzes, birds, alligators and other curios to tourists and visitors. In this quarter the French language is generally used, though all of the inhabitants can speak English. The French market, located on the levee near Jackson Square, is one of the greatest curiosities of the city. Here in the early morning on week days and from eight to nine o'clock on Sundays can be found all of the different classes and nationalities represented in New Orleans and the vicinity. While French is the prevailing language, nearly all tongues can be heard. The American section is built on modern plans and contains the large business blocks and institutions and some of the finer residences, though many of the most costly homes are west of Audubon Park in the suburb Carrollton. Across the river are two other suburbs, Algiers and Gretna, both residential localities.

New Orleans is one of the great cotton markets of the world, and its position on the Mississippi has also made it an important commercial center and distributing point for the South. The construction of the jetties on the Mississippi (See MISSISSIPPI RIVER; JETTY) enables the largest ocean steamers to come to the docks, which stretch along the river front for about six miles. Over thirty lines of steamers give the city direct communication with European ports, and besides the exportation of cotton, much other produce is brought down the river and transshipped here. The city is also growing rapidly as a manufacturing center, its location in

the midst of the cotton and sugar regions and the cheap transportation of fuel making it an advantageous point for manufacturing purposes. The chief industries are refining sugar, cleaning rice, the manufacture of clothing, boots and shoes, furniture, cotton goods, tobacco and cigars and cottonseed oil.

HISTORY. The city was laid out by Jean Baptiste La Moyne in 1718 and was named for the duke of Orleans, who was at that time regent of France. In 1722 it became the capital of the French territory on the Lower Mississippi. In 1762 it was ceded to Spain, together with other French territory, but the inhabitants objected, and when the Spanish governor arrived four years later he was expelled. This gave rise to considerable trouble, during which the leaders in the revolt were severely punished. In 1800, by the Treaty of Ildefonso, the territory was ceded to France, and in 1803 it became a part of the United States, under the Louisiana Purchase. Near the city the last battle of the War of 1812 was fought (See NEW ORLEANS, BATTLE OF). The development of the cotton industry gave the city considerable impetus, and it grew to a population of over 100,000 before the Civil War. At the outbreak of this conflict New Orleans was an important military center for the Confederates, until it was captured in 1862 by the Federal forces, under Farragut and Butler, after which it was used as a base of supplies and a point from which to send military expeditions into the surrounding Confederate territory. During the reconstruction period the city suffered from misgovernment, but with the withdrawal of Federal troops and the reestablishment of home rule, prosperity returned. Population in 1910, 339,075.

New Orleans, BATTLE OF, the last battle of the War of 1812, fought January 8, 1815, between an American force, under General Andrew Jackson, and a British force, under Sir Edward Pakenham. The latter had come directly from Europe, bringing seven thousand men who had seen service with Wellington in the Napoleonic wars. After several weeks' delay, they advanced upon New Orleans, which was being defended by Jackson with a force of Kentucky and Tennessee backwoodsmen and other volunteers. With the greatest care, a breastwork had been built of earth, boxes and cotton bales, and when the assault was made by the British on January 8, 1815, in less than half an hour they were overwhelmed and driven back, with a loss of 2500 men, including their leader and many other

officers. The loss of the Americans was but eight killed and thirteen wounded. The battle was fought after the signing of the treaty of peace, but neither commander had been notified of this event. The victory made General Jackson the idol of the people and was one important cause of his election to the presidency.

New Philadelphia, OHIO, the county-seat of Tuscarawas co., 100 mi. s. of Cleveland, on the Tuscarawas River and the Ohio Canal and on the Baltimore & Ohio and the Pennsylvania railroads. The city is in an agricultural region, has good water power, and contains manufactories of steel, canned goods, roofing tile, woolen goods, carriages, flour and other articles. Springer's Park and Shorenbraun Springs are attractive features. The place was settled in 1805 and was incorporated three years later. Population in 1910, 8542.

Newport, KY., a city in Campbell co., on the Ohio River opposite Cincinnati, Ohio, on the Licking River opposite Covington, Ky., and on the Chesapeake & Ohio and the Louisville & Nashville railroads. Bridges and electric railways connect the three cities. Newport is a popular residence place for Cincinnati business men. It has a city park, and the principal structures are the public library, the courthouse, the city hall, the postoffice, the Newport and German national bank buildings and the Masonic Temple. The industrial establishments include a large rolling mill, a pipe foundry, lithograph and printing works, a watch case factory, a brass foundry and other works. The city has more than a score of churches, and many streets are well paved with brick and macadam. It was settled in 1791 and was chartered as a city in 1850. Population in 1910, 30,309.

Newport, R. I., the county-seat of Newport co., 30 mi. s. of Providence, on the island of Rhode, in Narragansett Bay, and on the New York, New Haven & Hartford railroad. The city has a beautiful location and a splendid harbor, with forts Adams and Geble at the entrance. There is regular steamship connection with New York, Providence and other cities; and the beautiful scenery, equable climate and excellent facilities for bathing, boating and driving have made the place a very fashionable and exclusive summer resort. The old town has narrow streets and quaint houses near the harbor, while the modern section reaches over to the ocean side of the island and is composed of

elaborate and very costly summer residences. Among the many places of interest are the bathing resorts, Eaton's Beach and Bailey's Beach; the ten mile ocean drive; Hanging Rocks; the deep rock fissure, locally known as Purgatory, and Spouting Rock, through which water is sometimes forced to a height of fifty feet. There are also several libraries, public parks, fountains, statues and monuments. The old state house; the city hall; Redwood Library; Trinity Church; a synagogue, said to be the oldest in the United States; Sayer House, which was the headquarters of the British army in 1777, and the Vernon House, which was Rochambeau's headquarters, are all of considerable interest.

The first settlement was made in 1639, and one of the first public schools in America was started here in 1640. In the latter part of the eighteenth century, the place was a great commercial center, and its trade for a time even exceeded that of New York City. During the Revolution it was occupied by British soldiers, and many of the houses were destroyed and the shipping so injured that it never recovered its former commercial position. There is now a large trade in fish, but the other industries are of only slight importance. Population in 1910, 27,149.

Newport News, VA., a city in Warwick co., 12 mi. n. e. of Norfolk and 75 mi. s. e. of Richmond, on Hampton Roads, at the mouth of the James River, and at the terminus of the Chesapeake & Ohio railroad. It has a fine harbor, is reached by several coastwise and foreign steamship lines, and conducts an extensive foreign trade. There are large shipbuilding yards, grain elevators, lumber mills, iron works and coal wharves. Electric railways run to Hampton, Old Point Comfort and other places. Casino Park, along the river in the heart of the city, is an attractive place. Newport News was settled in 1882 and was incorporated in 1896. The city has had a substantial growth. Population in 1910, 20,205.

New Red Sandstone, the name of a group of rocks lying between the Carboniferous and the Middle Triassic systems. The formations are loams, shales and sandstones, all of which are usually of a reddish color. The name was given this group to distinguish it from the Old Red Sandstone group of Europe. See CARBONIFEROUS SYSTEM; TRIASSIC SYSTEM.

New Rochelle, ro shel', N. Y., a city in Westchester co., 16 mi. from the Grand Central

New Siberia Islands

station, New York City, on an arm of Long Island Sound and on the New York, New Haven & Hartford railroad. It is a residence suburb and has some large colonial mansions, remaining from the Dutch and English periods. The old Leland Castle, which was known for its fine interior decorations, is now occupied by the Ursuline Seminary. The city has a well-kept park, a public library and a hospital. Other prominent structures are the Saint Gabriel's Church, the Masonic Temple and the Knights of Columbus building. A monument has been erected to the memory of Thomas Paine, who had his home here for several years. The place was settled in 1687 by Huguenots, some of whom were natives of La Rochelle, France. Population in 1910, 28,867.

New Siberia Islands, a group of islands in the Arctic Ocean, n. of Siberia. The largest of the islands are Kotelnoi, New Siberia and Liakhov. The total area of the group is 9650 square miles. The bones of numerous extinct animals have been found in these islands, fossil remains of the mammoth having attracted most attention. The islands are uninhabited.

New South Wales, a state of the Commonwealth of Australia, bounded on the n. by Queensland, on the e. by the Pacific Ocean, on the s. by Victoria and on the w. by South Australia. Its area is 310,376 sq. mi. Near the coast, in an irregular chain, runs the range of mountains which is known as the Great Dividing Range. This chain is called in the northern part of New South Wales the New England Range; in the center, the Blue Mountains, and in the south, the Australian Alps. The Blue Mountains, especially, are very rugged and much broken up by canyons and gorges. To the east of these mountains is a generally fertile strip, which is watered by a number of short, rapid rivers. West of the mountains is a great plateau, which at places is of a semi-desert character. The chief rivers of New South Wales, besides the Murray, which forms the southern boundary, are the Darling, the Murrumbidgee and the tributary of the latter, the Lachlan. There are numerous other rivers in the territory west of the mountains, but most of them are dried up during the dry season.

On the whole, the climate of New South Wales is healthful and not extreme. In the north, however, it is well-nigh tropical, and at places on the interior plains the temperature rises at times to 130°. The temperature of the coast is much lower. The average rainfall on

New South Wales

the coast is about 50 inches, while in the interior it is generally less than 20 inches and in places only 10 inches.

The mineral resources of New South Wales are plentiful. Coal fields extend over an immense area, and the total production of the coal mines in 1910 was over 8,000,000 tons. Copper ore of the richest quality has been found in great abundance, but this has not yet been extensively worked. Tin exists in large quantities, and iron is very generally distributed. Gold was discovered in 1851, and the total output of gold from that date to the present has been greater than that of any other metal. Of late years, however, the annual output of silver has been greater than that of gold.

The scarcity of water renders much of the surface far better adapted for pasturage than for agricultural purposes, though where the necessary moisture is present, heavy crops are raised. The chief products are wheat, maize, oats, barley, potatoes, hay and sugar cane, and vines and fruits of various kinds are also produced. The raising of sheep and cattle, however, is the chief employment of the people, and wool is the most important article of export. In 1910 there were over 45,000,000 sheep in New South Wales. Meats, leather, hides and tallow, as well as live stock, are exported. The manufacturing industries of the colony are not of great importance as yet, but they are growing steadily, and they include tanneries, woolen factories, soap and candle works, breweries, shipyards, foundries, machine shops and clothing factories. There are about 3800 miles of railway in operation, and there is an efficient telegraph system.

The constitution of New South Wales provides for a governor, a responsible ministry and a parliament of two houses, consisting of a legislative council, appointed by the king of England, and an assembly, elected by the citizens of the state. The Church of England has the largest membership of any one Church, and the Roman Catholic Church comes second. No aid is given to the Church by the State. Primary education is compulsory, but a small fee is charged those students who are able to pay. At the head of the educational system is the University of Sydney, and there are colleges, secondary schools and evening schools.

New South Wales was visited by Cook in 1770 and was settled in 1788 as a penal colony. This character it retained to 1839. The most important events in its history since that date have been the establishment of representative

institutions; the erection of Victoria into a separate colony in 1850; the separation of Queensland in 1859, and the discovery of gold in 1851 and the consequent increase in population and prosperity. New South Wales became one of the states of the Australian commonwealth in 1901. See AUSTRALIA; AUSTRALIA, COMMONWEALTH OF.

News'paper, one or more sheets of paper printed, folded together and distributed at regular intervals for conveying the news and other intelligence. The first attempt to circulate news by writing was made by the Romans. The generals of the imperial armies sent messages called *acta diurna* (daily doings) to the various officers under their command. Some centuries later a news sheet known as the *Gazetta* originated in Venice. It is from this that we get the name *Gazette*, so frequently applied to newspapers (See GAZETTE). The Chinese published the *King Pao* early in the eighth century, and this is the first printed newspaper known.

HISTORY. The first attempt to make a newspaper of the modern type was in the publication of the Frankfort *Journal* in 1615. The first English paper was the *Weekly News*, started in 1622. The first English daily was published in 1702, and the penny paper was established in England in 1709. The first newspaper of France appeared in 1631, and the first Russian paper in 1703, under the authority of Peter the Great.

The first newspaper in America was *Publick Occurrences*, issued in 1690, in Massachusetts, but it incurred the displeasure of the government and was immediately suppressed. The *Boston News Letter*, begun in 1704, is therefore regarded as the first American newspaper. This was followed in 1719 by the *Boston Gazette*. The *American Weekly Mercury* of Philadelphia was the first paper published outside of Boston. The *New York Gazette* appeared in 1725, and at the beginning of the Revolution there were thirty-seven papers in the colonies, all but four of which supported the American cause. The first daily was the *Advertiser* of Philadelphia, issued in 1784. This was followed the next year by the *Advertiser* of New York. The first penny paper in the United States appeared in New York in 1833. In 1830 American newspapers received a great impetus, and from that time to the present they have increased in number and strength.

MAKING A NEWSPAPER. The first newspapers were small affairs and were often printed on poor paper; the sheets were no larger than a

half-sheet of foolscap, and these were frequently printed on but one side. The proprietor was then editor, compositor and printer; many weekly journals in small towns are still managed in much the same way. Small city dailies and the better class of weeklies usually have two or more editors, in addition to a few reporters and a force of compositors and printers.

The large city daily has its force thoroughly organized under the following departments: editorial, news, advertising, circulation and printing. The *editorial* department of a large daily is in charge of the editor in chief, who determines the policy of the paper and decides what public issues shall be given most prominence. Under him are the department editors, each of whom has his staff of correspondents and reporters and is responsible for his department in the journal. The city editor looks after local news. The editor of the foreign department gathers news from foreign countries and often discusses the political situations abroad. The political and financial questions always occupy a prominent place, and these departments are in charge of able editors, who write the leaders for the editorial columns.

News for all departments is gathered by reporters and correspondents, each of whom is under the direction of one of the department editors. Local items are prepared for the paper by the reporters, but news from distant cities and foreign countries sent by telegraph goes to the telegraph editor, who directs its preparation for the paper (See ASSOCIATED PRESS). The matter for each department is finally submitted to the editor of that department, who selects enough to fill the space at his disposal.

When the matter leaves the editor, it goes to the composing room, where it is placed in type by linotype machines (See LINOTYPE). From the composing room, the type goes to the foundry, where the stereotype plates are made for the press (See STEREOTYPING). Web perfecting presses, which print both sides of the sheet at once, are used, and the paper is fed to the press from the roll or web (See PRINTING PRESS). The press prints, cuts and folds the papers ready for the mails or for city distribution. Some of these presses can print and fold 150,000 twelve-page papers per hour, printing, when desired, in twelve different colors.

The advertising and circulation departments are connected with the financial phase of the enterprise. The advertising manager solicits advertisements and sees that they are properly

placed in the paper. The manager of circulation uses his efforts in extending the list of readers for his journal. These departments are of great importance, since the paper depends upon them for its financial support.

Most of the work on a morning paper is done at night and has to be done rapidly. Long articles that come in late are cut into numerous sections, the sections are numbered and given to compositors, so that the entire article is placed in type in a few minutes. Illustrations are made from pen-and-ink drawings and from photographs by zinc etching and halftoning and can be prepared on short notice (See HALFTONE; ZINC ETCHING). There are about 60,000 papers in the world. Of this number the United States has over 22,000, a far larger number than any other country. Of these, about 16,400 are weekly and 2400 daily. The United States is followed by Great Britain, with 9500; Germany, with 8050, and France, with 6700. There are no other countries which have 3000 papers.

Newt, the popular name applied to various genera of animals, belonging to the amphibians, that live both on land and in water. *Water newts*, or water salamanders, as they are sometimes called, have a flattened tail for swimming. When they are full-grown the gills are cast off, but the tail is retained throughout life. The males are distinguished by a crest, or fleshy ridge, on the back. The food consists chiefly of water insects and larvae. Of the Old World species the *crested newt* is one of the best-known. It is about six inches in length and is common in fresh water pools and ponds in Great Britain. The *marbled newt* is also well known. Of the American species the *red spotted newt*, common in the eastern United States, is the most familiar. It is of a greenish color, with red dots on the sides, and is four inches long. See SALAMANDER.

New'ton, KAN., the county-seat of Harvey co., 200 mi. s. w. of Kansas City, on the Missouri Pacific and the Atchison, Topeka & Santa Fé railroads. The city has an extensive trade with the surrounding agricultural and stock-raising district and contains flour mills, creameries, a grain drill factory, a large ice plant and stockyards. Bethel College is located here, and the city has a public library, three banks and about seventeen churches. It was settled in 1871. Population in 1910, 7862.

Newton, MASS., a city in Middlesex co., adjoining Boston, on the Charles River and the Boston & Albany Railroad. It is a beautiful

residence place and has about 160 acres of city parks and a large reservation of 118 acres belonging to the Metropolitan Park district. The Newton Theological Institution, Lasell Seminary for women and Allen School for boys are located here. There is a large public library, and the other prominent buildings include the First Baptist and Eliot churches and the high schools. Newton is noted for the excellence of its school system; its Technical High School is the most complete institution of its kind in New England. A memorial to John Eliot has been erected near the site of Waban's Wigwam, where he began to preach to the Indians. The river furnishes water power, and the city has manufactures of machinery, electrical apparatus, silk, rubber, paper, shoes and other articles. The place was settled in 1631, but remained a part of Cambridge until 1688. It was given the present name in 1692 and was chartered as a city in 1873. Population in 1910, 39,806.

Newton, ISAAC, Sir (1642-1727), the most distinguished of natural philosophers, equally



SIR ISAAC NEWTON

famous as a mathematician and astronomer, born in a little village in Lincolnshire, England. He was sent at an early age to the village school, and in his twelfth year he went to the town of Grantham, where he remained till he was entered at Trinity College in 1660. In 1665 he took his master's degree at Trinity College and a few years later was made professor there. His

interests were not wholly confined to studies, for he was a member of Parliament and took an active part in public affairs. In his fifty-fifth year he was appointed warden of the mint. He was for years a member of the Royal Society and in 1703 was elected president, a position which he held until his death. He was buried in Westminster Abbey, where ten years later a beautiful monument was erected to his memory.

In addition to his services to his country in Parliament and elsewhere, he made some of the greatest discoveries of the age. In physics he discovered the law of gravitation, and though he was not wholly right in his propositions, he added a great deal to the knowledge of light and color. In algebra he discovered the binomial theorem. In astronomy he invented a refracting telescope and applied the laws of gravitation to the heavenly bodies. All of his work on light and color is collected in a book under the title *Optics*. His greatest work was the *Principia*, in which he laid the foundation of modern physics and mathematics.

New Ulm, MINN., the county-seat of Brown co., 26 mi. n. w. of Mankato, on the Minnesota River and on the Chicago & Northwestern and the Minneapolis & Saint Louis railroads. The city has a considerable trade with the surrounding rich agricultural and stock-raising district. It contains grain elevators, flour mills, breweries, cigar factories, brickyards, creameries, machine shops, potteries and various other works. There are the high school and Turnverein libraries, a fine courthouse, Saint Alexander Hospital, five churches, Saint Michael's Academy and the Doctor Martin Luther College. The place was settled by a German land company in 1857, was incorporated in 1870 and was chartered as a city in 1876. The inhabitants are chiefly of German descent. Population in 1910, 5648.

New Westminster, a city of Canada, the former capital of British Columbia, on the Frazer River and the Canadian Pacific and other railroads. The surrounding country is agricultural. The most important industry of the town is the salmon fishing and the canning of salmon and other fish. The trade is large in lumber and furs, and there are machine shops, carriage works and foundries. Population in 1911, 13,199.

New Whatcom, *whaht'kom*. See BELLINGHAM.

New Year's Day, the first day of the year, celebrated from the earliest times by various

nations by some sort of festival. Of course, among the ancient nations the time set as the beginning of the year differed, but all treated it with some special observance. In the early church any celebration of the day was at first forbidden, but later the day was made a Christian festival. Previous to the sixteenth century, even in Christian countries, different days were recognized as the beginning of the year, and it was not until 1752 that January 1 was declared by the Parliament of Great Britain as the opening day of the year for that country. In most countries where celebrations have been held on New Year's Day, these have consisted largely in feasting and the interchange of presents, and the custom of keeping watch on New Year's Eve and ushering in the new year with mutual good wishes has been in vogue since ancient times. The "ringing in" of the new year by bells tolled at midnight, and the interchange of visits on New Year's Day are old customs.

New York, the EMPIRE STATE, one of the North Atlantic states, is bounded on the n. by the Province of Quebec and Lake Ontario; on the e. by Vermont, Massachusetts and Connecticut; on the s. by New Jersey and Pennsylvania; on the w. by Pennsylvania, the Province of Ontario and Lake Erie; and on the n. w. by the Province of Ontario, from a portion of which it is separated by the Saint Lawrence River. The Niagara River also forms a part of the western boundary, and the deepest channel in Lake Champlain forms a portion of the eastern boundary. The extreme length of the state from north to south is 312 mi. and from east to west, 326 mi. The area is 49,204 sq. mi., of which 1550 sq. mi. are water. This area, however, does not include the portions of Lake Ontario and Lake Erie adjoining New York. Population in 1910, 9,113,614.

SURFACE AND DRAINAGE. New York has a great diversity of surface, but it is easily divided into six physical regions, including Long Island. The first is the Adirondack region, which occupies all of the northern and eastern portions of the state, and comprises over 5000 sq. mi. This section is characterized by the ranges and groups of mountains belonging to the Adirondacks. They rise abruptly, beginning a short distance west of Lake Champlain, and contain numerous ranges that run approximately northeast and southwest. These are comparatively low mountains, Mount Marcy, the highest peak, attaining an elevation of only 5344 feet. The slopes of these mountains are steep, and the intervening

valleys are strewn with boulders. Their sides are heavily timbered with pine, spruce and other woods, and the valleys contain numerous lakes. Vast tracts of this region are still wild forests. A large state park has been created in the heart of these mountains, in order that the forests may be preserved (See ADIRONDACK MOUNTAINS). To the south, these mountains slope to the Mohawk valley, and to the southwest they descend to the lake shore plain, which borders Lake Ontario.

The second mountain region occupies a narrow belt in the southeastern border of the state, extending north to about the head of Lake Champlain. This contains an extension of the Appalachian Mountains, which cross New Jersey and the border of the Hoosac range, forming the boundary between Massachusetts and New York. It slopes gradually towards the Hudson River and is a well-watered and fertile region, not very abrupt and easily cultivated.

West of this and south of the Mohawk valley is the Catskill region, which is a somewhat broad plateau, upon which rise the Catskill Mountains, covering an area of over 500 sq. mi. These are in the form of a group, rather than a range, and their highest peak, Slide Mountain, has an altitude of 4205 feet; a few other peaks reach about 3000 feet. Many of their slopes are wooded, the intervening valleys are fertile and this region, like that of the Adirondacks, is a favorite summer resort.

Extending westward from the Catskill region and covering that portion of the state between the southern boundary and the lake shore plain and Mohawk valley is the great plateau region, well watered by numerous streams and lakes, and valuable for agricultural products. The southern part of this is quite broken, and along the Pennsylvania line, in the south central part of the state, the counties contain numerous high hills and deep valleys. The highest part of this plateau is in Otsego co., a little east of the center of the state. Here the Delaware and the Susquehanna rivers have their sources. The northern part of this plateau consists of slightly rolling country, dotted here and there by patches of woodland, but mostly under a high state of cultivation.

To the north of this is the lake shore plain, which rises gradually from Lake Ontario in two terraces, the first of which was the former shore of the lake. This plain is divided near its western extremity into two sections by a formation of hard limestone, forming the cliff over which the

cataract of Niagara plunges into the gorge of Niagara River, and it is also over this terrace that the Erie Canal descends at Lockport. The surface of this region is slightly undulating, with a gentle slope towards the lake. Extending from the southeast point of Lake Ontario to the Hudson River in the vicinity of Albany is the low, narrow valley of the Mohawk River, characterized by its nearly level slope. This afforded the natural route for the construction of the Erie Canal, to which New York owes so much of its industrial prosperity. Long Island is a part of the coastal plain and is low and nearly level.

The drainage of New York is nearly as complex as its surface. With the exception of the northeastern counties, the eastern part of the state is drained through the Hudson River, which is the most important stream wholly within the state. Its chief tributary, the Mohawk, waters the central portion of the state, and south of that are found the Catskill and the Shawangunk. The northeastern portion of the state is drained through Lake Champlain into the Saint Lawrence; the northwestern counties are drained directly into this stream, while the lake shore plain contains a few short rivers flowing into lakes Ontario and Erie. The Delaware and the Susquehanna have their sources a little east of the center. The extreme southwestern part of the state is drained through the Allegheny River into the Ohio, and thence to the Mississippi. Many of the streams contain deep gorges and beautiful waterfalls. Chief among the latter are Niagara Falls (See NIAGARA FALLS AND RIVER); Glens Falls; the falls of the Genesee River; Taughannock Falls, near Cayuga Lake, the highest in the state, having a fall of 230 feet, and the falls of the Mohawk, where it enters the Hudson, near Cohoes.

New York contains a large number of lakes, either wholly or partly within its boundaries. Located in the Adirondack region, in the region just to the south of it and in the central part of the state are hundreds of lakes of all sizes, adding much to the scenic beauty of the state. Worthy of note in the eastern part of the state is Lake George, about 40 miles in length. In the plateau region, directly south of Lake Ontario, is a group of long, narrow, navigable lakes, nearly parallel to each other, with their greatest length extending north and south. The most important of these are Cayuga, Seneca, Canandaigua, Onondaga and Keuka. To the northeast of these is Lake Oneida, and in the southwestern county is

Chautauqua Lake, noted as a summer resort.

CLIMATE. The climate of New York is varied, with a range wider than that of any other of the Atlantic states. Those portions which are under the influence of ocean, sound and lake winds are more even in temperature. Other regions suffer severely from the early frosts of autumn and the late frosts of spring, from extremes of heat in summer and of cold in winter. In the Adirondack region the summer is delightful, but the winters are long and severe. The mean annual temperature of the state is 47°; the average annual precipitation, including snow, is about 41 inches.

MINERAL RESOURCES. The Adirondack region contains extensive deposits of iron ore. Along the Hudson and in other parts of the state there are extensive quarries of limestone, suitable both for building purposes and for the manufacture of Portland cement; the value of these quarries is over \$8,000,000 annually. Marble and granite are also found, the latter in large quantities, and along the Hudson there are large beds of brick clay, estimated to be worth \$12,000,000 annually. In the vicinity of Syracuse there are extensive deposits of rock salt, which since 1893 have made New York the leading state in the production of salt. Natural gas and petroleum are found in the southwestern section. Gypsum, lead, graphite and sandstone, including the brown stone used for house fronts, are also found in large quantities.

AGRICULTURE. More than half of the state is under cultivation, and New York is one of the most important agricultural states. The rainfall is abundant, and the climate is well suited to all products that can be raised in a medium temperate climate. In general, the farms are small and under a high state of cultivation, although during the last ten years the number of farms of improved land has considerably declined, while the annual value of farm products has not diminished and in some years has greatly increased, due to the wider use of agricultural machinery and in some portions of the state to the raising of livestock and to the products of dairy farms. The variety of surface, the means of transportation and the variations in climate give the agriculture of the state a wide diversity of interests. The counties along the lower part of the Hudson are favorably situated for market gardens and for producing dairy articles for the city; hence, the farms in this region are largely devoted to these industries.

Through the plateau regions, the soil and climate are better suited to the growing of cereals and fruits, and here large quantities of potatoes, corn, oats, beans, apples, peaches and plums are raised. In the northwestern part of the state, which includes the western slope of the Adirondack region and the eastern portion of the lake shore plain, the farmers are chiefly engaged in dairying, producing butter and cheese in large quantities. This industry also extends quite generally across the central part of the state. In the central counties hops are extensively raised. The raising of live stock is confined very generally to dairy cows and other cattle, while horses, sheep and swine are found in sufficient numbers to supply local demand. The large quantities of grapes raised in Western New York makes it possible for this state to rank next to California and Ohio as a wine-producing state.

MANUFACTURES. New York is the leading state in the Union in manufactures, both in extent and variety of her products. The manufacturing industries include almost everything that is made. Though chiefly centering around New York City and Buffalo, they are widely distributed through other parts of the state. The forest regions of the Adirondacks and Catskills give rise to the manufacture of considerable lumber in these localities. Some lumber is also produced in the south central counties. Along the Hudson are the largest brick works in the world, and the clay products of the state exceed \$8,000,000 a year in value. Of the factory products the manufacture of clothing takes first rank, New York City occupying the first place and Rochester the seventh, in the United States, in the value of this production. This is followed by the manufacture of cotton and woolen goods, silks and other textiles; also paper and paper articles. The production of foundry and machine shop products is also very large, including the manufacture of many small machines, such as sewing machines and typewriters, besides agricultural machinery and implements. Many of these products are manufactured extensively for the export trade. Troy is the great center of the United States for the manufacture of collars, cuffs and shirts, while Rochester leads in the production of optical instruments and cameras. The great water power developed at Niagara Falls (See NIAGARA FALLS AND RIVER) has fostered numerous industries in this part of the state, some of which are found nowhere else in the country. Among these are the plants for

the production of aluminum, nearly the whole output of which is made here. Canning is also an enormous industry, especially in the central part of the state, including milk products, large and small fruits, vegetables and soups. Next to New York, Buffalo is the greatest manufacturing center, and among its leading industries are found the production of flour and grist mill products. See BUFFALO; NEW YORK (City).

TRANSPORTATION AND COMMERCE. The entire state is amply supplied with railways and navigable streams and canals. The New York Central & Hudson River Railway, with all of the lines under its control, extends from New York City northward to Albany, then westward to Buffalo. This system contains numerous other lines, running either parallel to its main line or acting as feeders for it. Besides these are the Erie, the Lehigh Valley, the New York, Ontario & Western and numerous other important trunk lines, making a total of over 8500 miles. The Erie Canal, connecting Lake Erie, at Buffalo, with the Hudson, at Albany, is one of the most important canals in the world (See ERIE CANAL). The Hudson is now navigable as far as Troy, and as there are important ports on Lake Ontario, the state has already water communication extending from the Atlantic through the Great Lakes to the interior of the country.

In commerce New York surpasses all other states. Over one-third of the exports and nearly two-thirds of the imports of the United States pass through the port of New York City. Besides this, much of the domestic traffic between the East and West passes through the state. In addition to this carrying trade, the great diversity of industries within the state itself, combined with her large population, makes her domestic commerce larger than that of any other section of the United States of the same area.

GOVERNMENT. By the present constitution, adopted in 1894, the legislature consists of a senate of 50 members, chosen for two years, and a house of representatives, called the assembly, of 150 members, chosen annually. The membership of both houses is apportioned by districts according to population, but county lines are not broken in forming these districts. The executive department consists of a governor a lieutenant governor, a secretary of state, a comptroller, a treasurer, an attorney-general and a state engineer and surveyor, elected for two years. The other officers, as well as administrative boards having charge of charities, health and railroads, are confirmed by the senate. The

state courts consist of the court of appeals, which is the highest court and is composed of a chief justice and six associates, elected for fourteen years; a supreme court, composed of 76 judges, each elected for fourteen years; four appellate divisions of the supreme court; county courts; surrogate courts; city courts; justices of the peace; police justices and a court of claims. The state is divided into eight judicial districts, in which sections of the supreme court sit. Cities and towns manage their own local judicial affairs through courts which they establish under acts of legislature. Because of the large number of cities within the state, they have been divided by the legislature into three classes, the first class including those of 250,000 or more inhabitants, the second including those between 50,000 and 250,000 inhabitants, and the third, those below 50,000 inhabitants. Each class is allowed to organize its government according to general plans established by the legislature.

EDUCATION. The state maintains a well-organized and highly efficient system of public schools. These are under direct control of the state board of regents, consisting of 12 members elected by the legislature and known as the University of the State of New York. The executive officer of this body is the commissioner of education, who has general charge of system of public instruction, and in addition, the supervision of the State Library and the State Museum (See NEW YORK, UNIVERSITY OF THE STATE OF). Fifteen normal schools for the training of elementary school teachers, and one normal college (at Albany) for the training of secondary or high school teachers are maintained by the state. The state agricultural colleges and experiment stations are connected with Cornell University at Ithaca, and with Saint Lawrence University at Canton. The most important higher institutions of learning, not under control of the state, are Columbia University, New York University, Cornell University, Syracuse University, the College of the City of New York, Vassar College at Poughkeepsie, Colgate University at Hamilton, Hobart College at Geneva, Union University at Schenectady, the University of Rochester, Saint Francis Xavier and Saint John's colleges in New York City, and a large number of medical, technical and theological institutes located throughout the state. At West Point is the United States Military Academy. See MILITARY ACADEMY.

INSTITUTIONS. The state maintains over 500 charitable and penal institutions which are under the supervision of boards of charities, correction

and lunacy. The asylum for feeble-minded children is at Syracuse, and that for feeble-minded women is at Newark. The school for the blind is at Batavia, and that for crippled and deformed children at Tarrytown. The hospitals for the insane are at Willard, Binghampton, Buffalo, Flatbush, King's Park, Dannemora, Gowanda, Mattewan, Middletown, Ogdensburg, Poughkeepsie, Rochester, Utica and Ward's Island. The penal institutions are in charge of a superintendent of state prisons and include the prisons at Ossining (Sing Sing), Auburn and Clinton, the reformatories at Elmira and Napanock and the reformatory for women at Bedford. Penitentiaries for the confinement of offenders who receive short sentences are county institutions and are located in New York, Kings, Erie, Monroe, Clinton and Albany counties. There are also a number of reform schools and industrial institutions for juvenile offenders and a house of refuge for women.

CITIES. New York contains a larger number of cities than any state except Massachusetts. The most important are Albany, the capital; New York, including Brooklyn; Buffalo, Rochester, Syracuse, Troy, Utica, Yonkers, Binghampton, Elmira, Schenectady, Auburn, Newburgh, Kingston, Poughkeepsie and Cohoes, each of which is described under its title.

HISTORY. In 1609 the Frenchman Champlain and the Englishman Hudson, who was in the employ of the Dutch, both entered the territory of New York, the former descending from Canada by way of Lake Champlain, the latter ascending the Hudson River. Owing to their alliance with the Iroquois Indians, the Dutch were the first to establish prosperous settlements, and they maintained a profitable fur trade for years. In 1624 Albany was settled, and two years later New Amsterdam (now New York) was founded. The Dutch came into constant collision with the English on the east and the Swedes and English on the south, and finally were forced to relinquish their hold on the territory in 1664, when New York, New Jersey and Delaware were all conquered by England and granted to the duke of York. For a time the colony prospered under liberal rule, but it was later made the victim of worthless and unscrupulous governors. It suffered severely by the invasions of French and Indians in the wars of the eighteenth century. In the early days of the pre-Revolutionary struggle the colony was about evenly divided between Tories and patriots, but the latter gradually

gained the upper hand, and some of the most defiant actions of the whole struggle were taken by New York. An independent government was organized in 1775, and a constitution was adopted in 1776, which remained in force 45 years. The second constitution was adopted in 1822, the third in 1846, the fourth and present one in 1894.

New York was among the first to ratify the Articles of Confederation (1778), but it opposed a strong Federal government, two of its three delegates withdrawing from the constitutional convention. It was the eleventh state to ratify the Constitution (July, 1788). The Federalists were at first dominant in the state, but after 1800 for more than twenty years the Anti-Federalists were in power, chiefly under the leadership of De Witt Clinton. The Erie Canal was constructed between 1817 and 1825. Though a free state, New York was divided in the slavery struggle, and during the early years of the war the Democrats, or anti-administration party, were in power. Nevertheless, it was one of the strongest supporters of the Union cause and furnished 467,000 troops to the Federal army. Since the war the state has rapidly grown in wealth and population, being aptly called the "Empire State." It has been doubtful in politics for many years. Consult Robert's *New York*, in the American Commonwealths Series.

New York, the largest city of the Western hemisphere and, next to London, the largest in the world. It is located in the State of New York, at the mouth of the Hudson River, which enters the Atlantic Ocean through New York Bay. It occupies a location naturally fitted for a great city, and it has one of the finest harbors in the world. A great bay 6 miles long and 5 miles wide enters from the ocean through the Narrows, a strait guarded by forts Hamilton and Wadsworth. Old New York is located on Manhattan Island, which is about 13 miles long, with an average width of a little less than 2 miles. The Hudson River, a broad, magnificent, navigable stream, flows along the west side of the island. Manhattan is separated from The Bronx by the Spuyten Duyvil Creek and the Harlem River. The East River connects Long Island Sound and New York Bay, separating Manhattan from Queens and Brooklyn. As the East River and the Sound are both navigable for large craft, the facilities for commerce are unrivaled. On Long Island, across from the lower end of Manhattan Island, was the city of

New York (City)

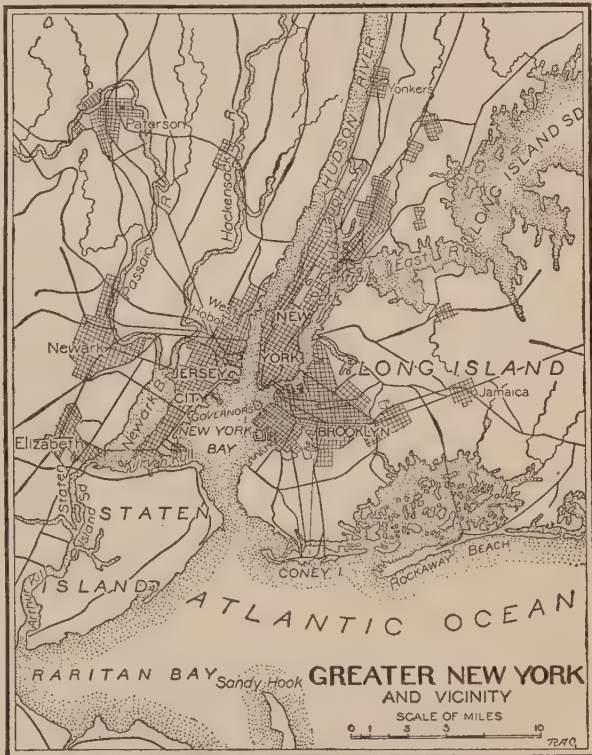
Brooklyn, and across the Hudson, in New Jersey, are Jersey City and Hoboken, which, though not included in Greater New York, are yet to all intents and purposes a part of it.

Greater New York, as established by charter in 1897, consists of five boroughs, of which the chief is Manhattan; the others are Brooklyn, Queens, Richmond and The Bronx. The borough of Brooklyn is coexistent with King's County, on Long Island (See BROOKLYN). The borough of Queens extends north and east of Brooklyn on Long Island and is noted for its great manufacturing establishments, especially in Long Island City. The Bronx, north of Manhattan, and Richmond, south of the Bay, are mainly residence districts. The total area of the city is 309 square miles.

New York is 232 miles southwest of Boston; 226 miles northeast of Washington; 911 miles east of Chicago and about 2700 miles east of San Francisco. There are numerous railroads connecting New York with other cities in the United States; ships from all parts of the world enter her harbor; submarine cables, wireless telegraph stations and ordinary telegraph and telephone connections place her in communication with all the cities of the country. The principal railways are the Erie, the New York Central & Hudson River, the Pennsylvania, the West Shore, the Baltimore & Ohio and the New York, New Haven & Hartford. The New York Central and the New York, New Haven & Hartford have a great terminal station on 42d Street and Park Avenue, Manhattan. The Pennsylvania station, located on 33rd Street and Seventh Avenue, and connected with New Jersey by tunnels under the Hudson River, and with Long Island by tunnels under the East River, is one of the finest depots in the world. The other lines terminate on the west bank of the Hudson and transfer passengers and freight by ferries or tunnels. New York has electric railways running the length of the Island on several of her principal streets and avenues, abundant cross-town lines and a very complete system of elevated railway lines, which run from the south end of the Island into The Bronx. Besides these, there are subway lines leading north into

New York (City)

The Bronx and under the East River into Brooklyn from the lower end of the island. Innumerable ferries cross the Hudson and the East River. Tunnels under these rivers also connect Jersey City and Hoboken, N. J., with Manhattan, The Bronx, Brooklyn and Queens, carrying throngs of people to and from the city night and day. (See TUNNEL.) The East River is spanned by four wonderful bridges, the Brooklyn Bridge, the Williamsburg Bridge, the Queensboro Bridge and the New Manhattan Bridge, all suspension bridges fixed so high above the river



as not to impede navigation (See BRIDGE, sub-head *Suspension Bridges*). The Harlem River is also crossed by remarkable bridges, among which is High Bridge, which carries the old Croton Aqueduct.

STREETS, PARKS AND MONUMENTS. The business center of New York is the southern end of the island of Manhattan, the oldest part of the city. Here the streets are narrow and crooked, having come into existence without definite plan. North of 14th Street, however, the city is laid out with regularity. The principal street running north and south is Broadway,

which extends from the lower end of the island, changing its direction at 14th Street to the northwest, and is continued under the same name many miles beyond the limits of Greater New York. Near the southern end of Broadway are the largest banks and the great commercial houses, while to the north is the retail district and still farther north, the homes of the well-to-do. The East Side of New York is the tenement district, and on the west, along the Hudson, are manufacturing plants and large wholesale houses. The avenues, which become parallel after leaving 14th Street, run north and south and are numbered from east to west. All, however converge at the south end of the island. On Second, Third, Sixth and Ninth avenues are the elevated railways, which also converge at the Battery. The cross-town streets at the lower end of the island run in different directions and are named without regard to plan, but at Houston Street, on the East Side, the cross-town streets run east and west and are numbered toward the north. From 13th Street north, they cross the island in parallel lines, the house numbers lying east and west from Fifth Avenue. The whole lower half of the island on both sides is practically lined with docks, which are connected with the street railways and the great trunk lines. Fifth Avenue was once the fashionable residence street, and it still is so, north of 50th Street, but the lower end is now given over to fine retail stores, hotels and business houses. Wall Street is a short, narrow street that runs from Trinity Church, on Broadway, to the East River. The subtreasury and many of the banking houses are located on it.

Small squares or parks serve as breathing places in the densely crowded city. Washington Square, Union Square and Madison Square are the most noted of these. All are surrounded by fine buildings, and each has its own peculiarities. At the south end of the island is Battery Park, in which, on the site of the old Castle Garden, is located the Aquarium (See CASTLE GARDEN). Riverside Park is a strip of land running along the Hudson River from 72d Street to 129th. Near the upper end of it is the tomb of General Grant. Riverside Drive is a beautiful boulevard, extending the whole length of the Park. Millions of dollars have been spent in the construction of other drives and boulevards, of which the Harlem Speedway, extending for two miles along the western bank of the Harlem River, from 155th Street north, has been among the most expensive. A handsome viaduct now

connects the Riverside Drive with the Heights to the north of its terminus. Central park is the greatest park in New York, and is one of the finest in the world. It is a rectangle lying between Fifth and Eighth avenues and 59th and 110th streets. The northern half of the park has been left almost in a state of nature, and nothing could be more beautiful, for it is hilly and heavily wooded, abounding in high rocky ledges that make the natural scenery picturesque. Near the center of the park are the Croton Reservoirs, which contain the water supply of the city; south of these are artificial lakes, beautiful drives, conservatories and statuary. Nature has been aided by landscape gardeners, until the whole tract is exceedingly beautiful. It is visited by thousands of people who go there every day. The largest and most attractive park in Brooklyn is Prospect Park, which has beautiful driveways and statuary in it. In the borough of The Bronx are Bronx Park, Van Cortland Park and other tracts, great portions of which are still entirely in a state of nature. In the Bronx Park are the zoological gardens and the botanical collection, which are visited daily by thousands of people. In Van Cortland Park golf links, ball grounds and polo grounds afford opportunities for summer games, while on the lake the skaters are cared for in the winter. The most noted summer resorts are Coney Island, Brighton, Manhattan and Rockaway beaches. Governor's Island in the harbor, a fortified military reservation, is the headquarters of the military department of the Atlantic, and the residence of the major-general commanding. Ellis Island, near Bedloe's Island, is the landing place of all immigrants entering at the port of New York.

New York's most impressive monument is the bronze statue of *Liberty Enlightening the World*, on Bedloe's Island in the harbor (See LIBERTY STATUE OF). In Washington Square is the marble Washington Arch, completed in 1892. This is 70 feet high and was erected by popular subscription at a cost of \$128,000. In Central Park is a granite obelisk, which was brought to this country from Egypt. This obelisk was hewn and inscribed by Thothmes III, although one of its sides is also inscribed with the victories of Rameses II, a king who lived three centuries afterward. The obelisk was presented to the city of New York by Ismail Pasha and was brought to this country at the expense of William H. Vanderbilt. There are a number of beautiful statues and fine figures in marble and bronze



STATUE OF LIBERTY, IN NEW YORK HARBOR
The gift of the Republic of France to the people of the United States.



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WOOLWORTH BUILDING, NEW YORK CITY

The tallest building in the world, with stores and offices on 55 floors. The observation platform is 755 feet above street level.

New York (City)

in different parts of the city, especially in Central Park and the public squares. Among these are a granite statue of Alexander Hamilton; a bronze statue of Shakespeare by J. Q. A. Ward, in Central Park; a noble equestrian statue of General Sherman by Saint Gaudens, on the Plaza at Fifth Avenue and 59th Street; a bronze figure of Peter Cooper by Saint Gaudens, south of Cooper Union; a bronze statue of Lafayette by Bartholdi, in Union Square, and the colossal figure of Washington by Ward, at the sub-treasury in Wall Street. The tomb of General Grant is a marble temple at the north end of Riverside Park, and from its location it is one of the most conspicuous objects in the northern part of the city. The Soldiers' and Sailors' Monument on Riverside Drive and 89th Street, the Soldiers' and Sailors' Memorial Arch fronting Prospect Park, Brooklyn, and the Prison Ship Martyrs' Monument in Fort Greene Park, Brooklyn, are among the finest in the city.

BUILDINGS AND INSTITUTIONS. The public buildings of New York are very fine, quite in keeping with the size and importance of the city. The postoffice, in City Hall Park, is one of the finest of the older buildings. Back of it, and near it, are the county courthouse and the hall of records, both new buildings. The sub-treasury, in Wall Street, is one of the fine United States government buildings, but the new customhouse at the foot of Broadway, on the original site of Fort Amsterdam, costing \$10,000,000, is perhaps the finest. In a small park at 42d Street and Fifth Avenue is the new public library building, and about midway up the east side of Central Park is the Metropolitan Museum of Art, a fine building in which are housed some of the best collections in the country. Original paintings and statuary, together with reproductions of the famous pieces of foreign lands, make the museum a favorite resort of artists. The collections of jewels and porcelain and miscellaneous objects of art are extensive and exceedingly valuable. The museum is open to the public daily during certain hours. On the west side of the Park at 77th Street is the Museum of Natural History, a magnificent building in which is one of the finest collections in natural history to be found in the New World. The Aquarium at Battery Park has a fine collection of salt and fresh water life.

The most noted church of New York is probably the old Trinity Church, located on Broadway at the head of Wall Street. In the churchyard are buried some of the famous personages

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of early times. Grace Church, on Broadway and 11th Street, Saint George's, with its lofty spires, on Stuyvesant Square, and the Roman Catholic Saint Patrick's cathedral, on Fifth Avenue and 50th Street, are all interesting churches. The last is the finest Gothic edifice in this country. It is built of white marble, in the form of a Latin cross, and it has two beautiful spires rising to a height of 323 feet. On a rocky bluff on Morningside Park, overlooking Harlem Plains, is the Episcopal Cathedral of Saint John the Divine, now in process of construction. It will probably not be completed for many years to come. The total cost will be in the neighborhood of \$2,000,000, and in vastness of dimensions and beauty of design, the cathedral is expected to take a leading place among the great churches of the world. New York has many elegant hotels, clubs, theaters and other semi-public buildings, besides a vast number of great office buildings.

The city institutions which care for the poor, the sick and the disorderly are located on Blackwell's, Ward's and Randall's islands, in the East River, though other hospitals are to be found in various parts of the city, and patients suffering from contagious diseases are cared for in still other institutions in The Bronx. New York spends more for public education than any other city in the world. Besides its own public schools, which include numerous well-equipped high schools, there are located here Columbia University, the Teachers' College, the College of the City of New York, New York University, the College of Saint Francis Xavier, Manhattan College, Saint John's College, the Normal College, Barnard College, Adelphi College, Polytechnic Institute, Union Theological Seminary and the College of Physicians and Surgeons. (See COLUMBIA UNIVERSITY; NEW YORK, COLLEGE OF THE CITY OF; BARNARD, FREDERICK AUGUSTUS PORTER; NEW YORK UNIVERSITY). Free professional schools, numerous academies, schools of music and art and many historical and scientific associations afford opportunities of advancement to every one who seeks it. Many fine libraries have been established, and the consolidation of the Astor and the Lenox libraries and the Tilden trust fund in the New York public library makes one of the largest institutions of the kind in the country. Connected with the public library are numerous circulating libraries and reading rooms, and the Carnegie gift of \$5,200,000 provided for the establishment of 65 branch libraries.

GOVERNMENT. The charter of New York, as revised in 1901, has incorporated in it the important provisions which had proved satisfactory in the former city of Brooklyn and other American and European cities. The chief changes related to the establishment of the borough system and to the provisions which permit different localities to manage most of their own affairs. The executive power of the city is vested in the mayor and the heads of the different boroughs. The mayor, who holds office four years, appoints heads of departments and commissioners, except the commissioner of finance and officials under the control of the heads of the boroughs. He is chairman of the board of estimate and apportionment, which consists of the mayor, the comptroller, the president of the board of aldermen and the presidents of the several boroughs. He is subject to removal by the governor upon the establishment of charges against him. The president of each borough holds office for four years. He presides over the local board and exerts therein most of the powers of a mayor. He is also a member of a board of aldermen and has the same power to vote as any member of that body. The board of aldermen, consisting of 73 members, elected for two years in separate districts, is the legislative body, and passes ordinances and resolutions which the mayor has the power to veto, though by a two-thirds vote it may pass laws over his veto, unless they require the payment of money, in which case a three-fourths vote is required. The annual expenses of New York City are in the neighborhood of \$200,000,000, and the city property is valued at not less than \$350,000,000. The city has a bonded debt of more than \$420,000,000.

TRADE AND COMMERCE. About half of the total foreign trade of the United States passes through New York, whose commerce is five times that of the next largest American port. The coast trade of New York is much more valuable than the foreign trade, and the number of vessels engaged is many times greater. The commerce of New York has been increasing steadily, and since 1912 it ranks as the greatest port in the world, Hamburg being second and London third. In manufactures, New York surpasses the other cities of the United States by about 50 per cent. The capital invested is enormous, and the variety and value of the articles made is unequalled. Its most important industry is the manufacture of clothing. Sugar and molasses refining is second in point of value, and in the

printing and publishing business New York far outranks any other city of the United States. Malt liquors, tobacco, cigars, the roasting and grinding of coffee and spices, musical instruments, paints, electrical apparatus and supplies and finely finished manufactured articles without number indicate the variety of products and industries which engage the residents.

HISTORY. The first white man known to have visited Manhattan Island was an Italian, Giovanni Verrazano, who, sailing in the French service, entered the harbor in 1524. In September, 1609, Henry Hudson, in the service of the Dutch East India Company, explored the harbor and river, and soon after the Dutch began trading with the indians. But the first serious attempt at colonization began in 1623, when a band of thirty Dutch settlers arrived. Peter Minuit, the first governor, brought with him in 1626 another company of colonists and, having bought Manhattan Island from the indians for a very small consideration, christened the town New Amsterdam. Under Minuit and his successors, Wouter Van Twiller, William Kieft and Peter Stuyvesant, the colony prospered and grew, until in 1653 it numbered about 800 souls. In that year it was incorporated as a city. In 1664 Charles II of England granted the New Netherlands to his brother, the duke of York, who took possession of the city and renamed it New York. The Dutch regained the city in 1673, but a year later they gave way to the English. In 1686 the first city charter was issued, and in 1690 the first intercolonial congress was held in New York. The first printing press was established in the city in 1696; the first free school was opened in 1703, and the first newspaper, the *Gazette*, was founded in 1725. In 1732 a stage line was established between New York and Boston, but it was not until twenty-four years later that the Philadelphia stage began running. In the early part of the summer of 1776, a large part of the American troops were quartered in the city, and on July 8 the Declaration of Independence was publicly read to the soldiers and citizens. The next day the statue of George III on Bowling Green was torn down, but in September of the same year, the British occupied the city and held it from that time until "Evacuation Day," Nov. 25, 1783. From 1785 to 1790 Congress met in New York in the old City Hall, and here Washington was inaugurated in 1789. In 1807 Fulton's steamer, the *Clermont*, began making trips between New York and Albany, and in

New York (City)

1812 the first steam ferry to Long Island was opened. The completion of the Erie Canal gave an impetus to the growth of the city, which since that time has increased its population at a rate never equaled by any other municipality. Two cholera epidemics, a great fire with much loss of life, a financial panic and several riots have been events which seemed serious at the time, but which never succeeded in even delaying the city's progress. For several years after the Civil War the city suffered from political fraud perpetrated by the "Tweed Ring," but in 1871 the ring was effectually broken up. During the last forty years the material prosperity of the city has steadily increased, and everything seems to indicate that it will continue permanently.

POPULATION. In 1900 the population of Greater New York was 3,437,202; in 1905, 4,013,781. In 1910 it was 4,766,883, distributed through the boroughs as follows: Manhattan, 2,331,542; Brooklyn, 1,634,351; the Bronx, 430,980; Queens, 284,041; Richmond, 85,969. The most densely populated district is the lower East Side. Here, in 1910 there were about 735 people to the acre. More than half of this population were foreign born. Almost every nationality is represented among the foreigners, but Germans, Irish, Italians, Russians, Bohemians, Hungarians, Austrians, Poles and English are the most numerous.

New York, COLLEGE OF THE CITY OF, an educational institution supported by the city of New York. The college was established by the board of education in 1847, under the name of the New York Free Academy, and it combined the functions of a college and a polytechnic school. It developed steadily, and in 1866 its name was changed to the College of the City of New York. Any resident of New York City over fourteen years of age is eligible to admission. There are six four-year courses of study leading to the degrees of A. B. and B. S., embracing the Classical, Latin-French, Modern Language, General Science, Biology, Chemistry and Mechanical. The college faculty numbers about 240 and the enrollment exceeds 4500, and the preparatory department, maintained in connection with the college, has over 2000 more students. The library contains 45,000 volumes, and the value of the grounds, buildings and equipment is \$6,500,000.

New York, UNIVERSITY OF THE STATE OF. A department of public instruction established in 1754, under the name *Governors of the College of the Province of New York, in the State of*

New Zealand

New York, in America. In 1784 the university was reorganized and placed under control of a board of regents, whose duties comprised the establishing of schools and colleges which should be parts of the university; the supervision of secondary schools, such as high schools and academies, including the outlining of courses of study, the determining of the qualifications for admission and the establishment of standards on which certificates and diplomas of graduation should be given and degrees should be granted; the control of state libraries and museums, the issuing of charters to educational institutions and libraries, the direction of a system of examinations in subjects taught in secondary and professional schools and the distribution of state funds for secondary schools.

According to the present organization, the board of regents consists of twelve members elected by the legislature. The commissioner of education is the executive officer of the board. The first commissioner elected by the legislature was Hon. Andrew S. Draper, at the time president of the University of Illinois. His first term was for six years, at the expiration of which, following the law consolidating the two departments, he was again chosen by the board of regents. The educational system of the state has been organized under the following departments: Examinations, inspections, normal schools, training institutes, libraries, scientific work and museums, law, accounts, statistics and apportionments, printing and publications, administration, attendance, trades schools and visual instruction. In October of each year, under the auspices of the University of the State of New York, a convocation is held, at which the interests of high education are discussed.

New York University, an institution of higher learning, established in New York City and chartered in 1831. It includes the following departments: the university college, the law school, the medical school, the school of applied sciences, the school of pedagogy, the school of commerce, accounts and finance, the graduate school, the veterinary school and the summer school. The faculty numbers about 380, and the enrollment is over 4500. The library contains 110,000 volumes. Its productive funds amount to over \$1,500,000 and its income is over \$600,000. The most attractive building is the library, which has the colonnade known as the Hall of Fame. (See HALL OF FAME).

New Zealand, *see* land, a British colony in the South Pacific Ocean, about 1200 mi. s. e. of

Australia, lying between 34° 22' and 47° 20' south latitude and between 166° 40' and 178° 38' east longitude. The colony consists of two large islands, North Island and South Island, separated by Cook Strait, and a third small island, Stewart Island, about 25 miles south of South Island. The Auckland, the Chatham and other small outlying groups are also attached to the colony, and the total area is estimated at 104,471 sq. mi.

The surface of North Island is characterized by low hills and tablelands, densely forested. There are several volcanic peaks in the island, of which the highest is the extinct volcano Ruapehu, over 9000 feet in height; Tarawera and Tongariro are active volcanoes. There are a number of lakes of volcanic origin, of which the largest is Lake Taupo, which has a diameter of 22 miles and an enormous depth. The coast line of North Island is much indented, but as most of the bays are obstructed by bars, good harbors are few. The physical features of South Island are very different. There are no volcanoes, and the coast line is regular. Along the western coast runs an elevated mountain range, which is known as the Southern Alps and which rivals in its rugged beauty the European Alps. The height ranges from 8000 to over 12,000 feet. Forests cover the mountains to the snow line. On the western slope are great glaciers, while on the eastern slope extends a series of lakes, of which the largest and most beautiful is Lake Wakatipu.

Extending through 13 degrees of latitude and having a greatly diversified surface, New Zealand has necessarily a very varied, though a remarkably healthful, climate. In temperature it resembles France and North Italy, but the humidity is considerably greater. Rapid changes are a notable feature of the weather.

With mineral wealth New Zealand is liberally supplied. Coal is obtained in many parts, and copper has been worked on a small scale. Gold is worked both in North and South Island, and silver, copper, tin, antimony and manganese are found. Of the flora, the most characteristic forms are the ferns, of which there are about 130 different species. In some places these form almost the only vegetation over immense districts. Another characteristic plant, and one of great economic value, is the flax plant. A number of forest trees, among which is the kauri, or damar pine, furnish valuable timber. New Zealand is singularly deficient in animals, there being probably not a single indigenous

mammal. Rabbits have been introduced and have multiplied so as to become a pest; and pigs now run wild, as well as cats. Pheasants, partridges, quail and deer have also been successfully introduced. The native birds are remarkable neither for numbers nor for beauty of plumage. Pigeons and parrots are the most common, and the apteryx, a peculiar wingless bird, is the most interesting. The gigantic wingless birds known as moa are now extinct.

The soil and climate of New Zealand are well adapted to the production of every English grain, grass, fruit and vegetable. In the gardens of the warmer valleys, fruits of a semi-tropical character, such as the pomegranate, citron, orange and olive, may be raised. The largest crops are of turnips and rape, and oats, wheat and barley are next in importance. Stock raising, especially sheep grazing, is an industry of primary importance in New Zealand. There are about 25,000,000 sheep in the colony, and by far the most important exports are wool and frozen meat. Other important exports are gold, tallow, timber and kauri-gum.

The first railroad in New Zealand was opened in 1863, and in 1911 there were 2800 miles of railway, of which over 2750 were owned by the government.

The original natives of New Zealand, called Maoris, are said to have emigrated from the Navigator's or the Sandwich Islands centuries ago. Split up into numerous petty tribes, their numbers have been so much reduced that they now do not exceed 50,000, all of whom, with the exception of a few hundreds, are located in the North Island. By missionary efforts a great part of them have been converted to Christianity. They have acquired in many instances considerable property in stock and cultivated lands, and in the neighborhood of the settlements they are adopting European dress and habits.

Elementary education in New Zealand is free, secular and compulsory for children from seven to thirteen years old. Secondary education is provided for in numerous high schools and grammar schools, for attendance in which a small fee is required. At the head of the higher education is the University of New Zealand, an examining body empowered to grant honors, degrees and scholarships, and affiliated with this are several colleges throughout the colony. There are also training schools for teachers, art schools, engineering institutions and theological schools.

By the constitution, the Crown appoints the

governor, who is assisted by a ministry of eight members. The legislative power is vested in a General Assembly, or parliament, of two houses—a Legislative Council, consisting of 44 members who hold office for seven years and a House of Representatives, consisting of 80 members who hold office for three years. Representatives of the Maoris are admitted into both houses. The Church of England is most numerously represented in New Zealand.

The chief cities are Wellington, the capital; Auckland, Christchurch and Dunedin. Each of these is described under its title.

New Zealand was first discovered by Tasman in 1642, but little was known of it until the visits of Cook in 1773 and 1777. The first permanent settlement was made by missionaries in 1815, in 1841 it was formally separated from New South Wales and placed under its own independent governor, and in 1852 it received a constitution and a responsible government. Troubles with the natives of North Island about land gave rise to frequent Maori wars, and as late as 1886 a disturbance about land arose. In 1865 the seat of government was removed from Auckland to Wellington. The movement toward state socialism became prominent in 1890, and progress has been constant and rapid, until now the government controls almost all public utilities. In the South African War, New Zealand loyally supported Great Britain, and in 1914, after Great Britain had declared war against Germany, a New Zealand expeditionary force seized the German possessions in the Bismarck Archipelago.

The white population of New Zealand in 1911 was 1,008,468, besides about 50,000 Maoris, 12,000 Cook Islanders and 3000 Chinese.

Ney, nay, MICHEL, Duke of Elchingen, Prince of the Moskva (1769–1815), a marshal of France. He entered the military service in 1788 and was a member of a regiment of hussars when the French Revolution broke out. He rose by degrees to the rank of general of division in 1798, and as such he distinguished himself in the Rhine campaign. Appointed marshal of the Empire by Napoleon in 1805, he achieved a victory over the Austrians at Elchingen and took part in the battles of Jena, Eylau and Friedland. During the Russian campaign he commanded the third division at the Battle of the Moskva and conducted the rear guard in the disastrous retreat. In the campaign of 1813 his skill and courage decided the victory of Lützen and were of the greatest service at Bautzen and Dresden.

When Napoleon abdicated and the Bourbon dynasty was established, Ney took the oath of allegiance to the king and received a command; but when the emperor landed from Elba his old general joined him at Lyons and opened the way to Paris. When the allies entered Paris he escaped in disguise to the provinces, but was finally arrested, brought back to Paris, tried for treason and executed.

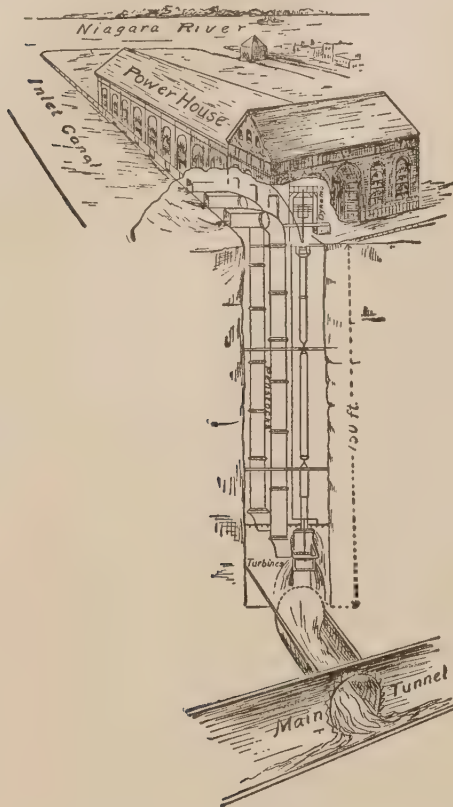
Nez Percé, na pair say', (pierced nose), an indian tribe who formerly lived in the eastern portions of Washington and Oregon and in central Idaho. After giving up their lands and taking new ones, they became displeased at the inroads of the miners upon their new territory, and under Chief Joseph they began a war in which their masterly leader for a long time defeated the regular United States troops. In fact, Joseph finally surrendered only under a promise to be returned to his old reservation. The government proved false to its word, and the indians were moved into the Indian Territory. More than half their number quickly perished there by disease, and in 1884 they were returned to a reservation in northern Washington, where they now remain.

Ngami, n'gah'me, a lake of South Africa, to the north of the Kalahari Desert. It was formerly a very large body of water, but it has gradually dried up, until now in the dry season it is little more than a marsh. It was discovered by Livingstone in 1849.

Niagara Falls, N. Y., a city in Niagara co., 25 mi. n. w. of Buffalo, on the Niagara River, just below the falls, and on the New York Central, the Wabash, the Erie and several other railroads. A portion of the water power of the falls has been made available by constructing a canal above them, to conduct water to a wheel pit 150 feet deep, at the bottom of which large turbines are placed. After being utilized, the water finds an outlet through a tunnel that opens into the gorge below the falls. Dynamos are attached to the turbines, and an electric current having over 50,000 horse power is generated. About three-fourths of this is used by local manufactories. The remainder is conveyed to Buffalo and employed to furnish power for the street cars, for numerous manufactories and for lighting the city. The principal products are paper, flour, dressed lumber, shredded wheat biscuits, aluminum, carbide, carborundum, electro-chemical goods, foundry products, machinery, chemicals and bleaching powder. De Veaux College and Niagara University are

Niagara Falls and River

located here, and the city has a Carnegie library and good public and parish schools. The state reservation here includes the land and the islands surrounding the American side of the falls and covers 107 acres. The city is connected



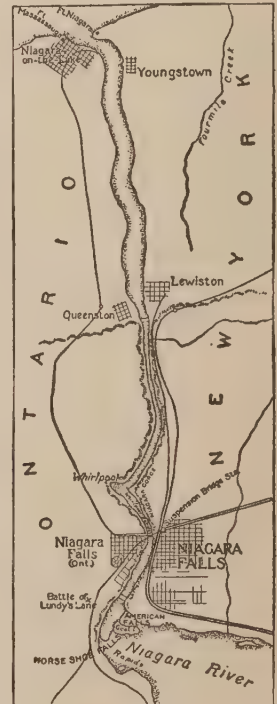
with Canada by three very remarkable bridges. In 1892 the villages of Niagara Falls and Suspension Bridge were consolidated and chartered as the city of Niagara Falls. Population in 1910, 30,445.

Niagara Falls and River. Niagara River connects Lake Erie with Lake Ontario and separates the State of New York from the Province of Ontario. The river is 33 miles long and has a fall of 331 feet between the two lakes. In the upper part of its course, for about 16 miles, the stream flows through a broad plateau, with scarcely any valley. Near the lower edge of this plateau is Grand Island, whose area is 17,000 acres, separating the river into east and west branches. After the branches reunite, the river flows quietly for a short distance and has a channel between two and three miles wide, which contains a number of islands.

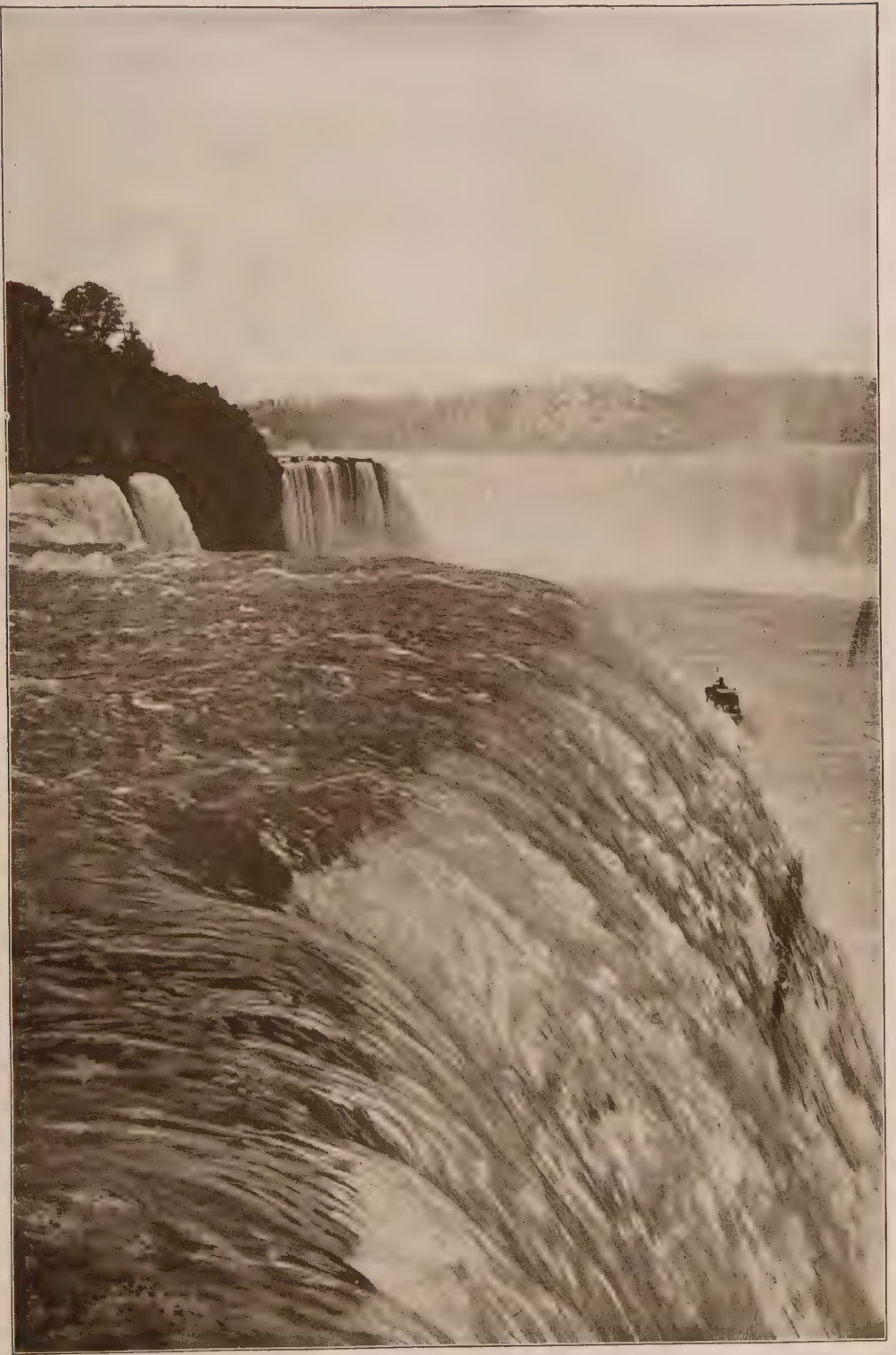
Niagara Falls and River

It then narrows and makes a rapid descent, forming the rapids over which the river falls 52 feet in a short distance. At the foot of the rapids are the falls, which are divided by Goat Island into two cataracts, known as the Canadian, or Horseshoe, Falls, on the west, and the American Falls, on the east.

The cataract Niagara is caused by the river's falling over a ledge of hard limestone, which is underlaid by layers of softer rock. This ledge outcrops a few miles south of Lake Ontario, and the Niagara Gorge, below the falls, has been formed by the wearing away of this rock by the cataract during the thousands of years that the river has occupied its present channel. The tremendous velocity of the water as it approaches the edge of the falls throws it out from the foot of the cliff to a distance of 20 or 30 yards. The lower strata of the rock under the falls have been worn away more rapidly than the upper layer, over which the water is precipitated, thus forming a sort of cave, into which visitors can enter, both at the outer end of the Canadian Falls and near Goat Island on the American side. In each



of these places paths have been excavated and platforms built, which enable sightseers to obtain a magnificent view of the falls. The place of entrance near Goat Island on the American side is known as the Cave of the Winds. The Canadian Falls, which are by far the larger, have an extent, measured on the curve, of 3010 feet, or on the chord of the circle, of 1230 feet. The height is 158 feet, and the depth of the water near the center of the fall exceeds 20 feet. The American Falls have a length of 1010 feet and a height of 167 feet, but the volume of water is far less than that in the Canadian Falls.



NIAGARA FALLS
The American Falls in the foreground

Below the falls the river flows through a gorge for about seven miles. For a good portion of the way the gorge is deeper than the height of the falls, and its sides are nearly perpendicular, so that it can be ascended in only a few places. For a portion of its course through this gorge the water moves quietly, but when it reaches a point about $2\frac{1}{2}$ miles below the falls, the water is precipitated over another series of ledges, forming the famous Whirlpool Rapids, which in many respects excel the falls in grandeur. Below these rapids the river makes a sharp turn to the left, and the force of the current has worn in the rock a large circular basin, around which the turbulent waters continue to flow, striving to find an outlet in the channel below. This forms the Whirlpool, which is the greatest maelstrom in the world. Below the Whirlpool the slope in the gorge is more gentle, and the waters flow with continually decreasing velocity until they reach the Ontario plain, about seven miles from the mouth of the river.

The river and falls of Niagara furnish some of the grandest spectacles of natural scenery in the world and are visited by thousands of tourists every year. In order that these places of interest could be visited without unnecessary expense and annoyance, the State of New York in 1885 secured control of the tract of land adjoining the falls and established Niagara Falls Park, which includes Goat Island and other small islands adjacent to it. The year following, the Canadian government established Victoria Park on the opposite side of the river. An electric railway on the American side extends down the gorge to near Lewiston, following the foot of the cliff, and on the Canadian side a similar railway has been built along the bluff. The lower suspension bridge now connects these lines, so that the visitor can make a circuit of the region, passing on one side on the top of the bluff and on the other at its foot, thus obtaining excellent views of all points of interest.

The Niagara gorge near the falls is spanned by three bridges, the first, a steel arch bridge for carriages and electric cars, about $\frac{1}{2}$ of a mile below the falls; the second, the cantilever bridge of the Michigan Central Railway, about 2 miles below the falls; and the third, the steel railroad bridge of the Grand Trunk railway, which was erected to replace the old suspension bridge, the first large structure of its kind erected in America (See BRIDGE, subhead *Suspension Bridges*).

The building of power houses and factories

along the shores of Niagara River and Falls (See NIAGARA FALLS, N. Y.) threatened for a time to destroy the grandeur of the view, by turning the main current from its natural channel, leading over the falls, to underground sluiceways and tunnels, where it generated power. The amount of water thus used had already made an appreciable difference in the volume of the cataract, and plans were completed for large extensions of the plants, when by a joint effort of the national government of the United States and the Dominion government of Canada, aroused by a popular agitation, provision was made for restricting the amount of water used for industrial purposes. Thus, one of America's greatest spectacles was at least temporarily saved.

Niagara Series, a division of rock formations belonging to the Silurian system and lying between the Trenton series, below, and the Salina, above. The formations are prominent in central and western New York and extend southward along the line of the Appalachian Mountains as far as Alabama, westward through Ohio, Indiana and Illinois and northward into Wisconsin. One of the formations contains extensive beds of hematite, reaching from Pennsylvania to Birmingham, Ala., where it becomes the source of supply for the iron and steel works of that locality. The formations include shale, sandstone and limestone. These different strata can be plainly seen in the gorge at Niagara Falls, where the disintegration of the limestone, caused by the wearing away of the upper strata, has caused the falls. See GEOLOGY; SILURIAN SYSTEM; TRENTON SERIES.

Nibelungenlied, *ne'be loong'en leet'*, one of the earliest and the greatest of national German epics, which, in some form or other, has existed from the thirteenth century. It is of unknown authorship and is, like most of the great national epics, rather a growth from separate ballad poems than a performance completed at any one period. It was originally founded on the story of Sigurd in the *Elder Edda*, and additions were made to it from time to time. The main story is as follows: Siegfried, heir of the king of the Netherlands, was besought by Gunther to aid him in winning Brunhilde of Iceland to be his wife. Brunhilde was to be won only by the man who could conquer her, and Siegfried, in Gunther's form, was able to do this only by obtaining help from the gods. Siegfried, in return for his aid to Gunther, was given Kriemhild, Gunther's sister, as his wife. Some years

later a quarrel arose between Kriemhild and Brunhilde, and Kriemhild boasted that it was her husband whose strength had conquered Brunhilde. Greatly enraged, Brunhilde induced one of Gunther's vassals, Hagen, to put Siegfried to death. Kriemhild, after a long mourning for Siegfried, married Etzel, king of the Huns. Meanwhile, the treasure of the Nibelungs, which had belonged to Siegfried and which carried with it a curse for its possessor, had been seized by Hagen, who threw it into the Rhine, intending later to rescue it. Years after her marriage to Etzel, Kriemhild invited her brother and his court to visit her, intending to avenge Siegfried's death. During the visit a combat arose between Gunther's followers and Etzel's, with the result that all of Gunther's people were killed, Kriemhild herself beheading Gunther and Hagen, when the latter refused to tell where the Nibelung treasure was buried. Kriemhild was killed by Hildebrand, a vassal of Etzel. As the knowledge of the hiding place of the Nibelung treasure died with Hagen, it is supposed still to lie at the bottom of the Rhine. Wagner has used this story as the basis of the musical drama *Ring des Nibelungen*.

Nicaragua, *ne kah' gwa*, a republic of Central America, extending from the Pacific Ocean to the Caribbean Sea, bounded on the n. and n. e. by Honduras and on the s. by Costa Rica. Its area is 49,200 square miles. The state is traversed by the Cordillera of Central America, between which and the Pacific coast there is a depression extending for 300 miles and containing Lake Nicaragua and Lake Managua. Along the coast is a chain of volcanic cones, which rise in some places to about 6000 feet. From the Cordillera the surface slopes to the Caribbean coast, which is low and swampy. Nicaragua has numerous rivers, the chief of which flow to the Caribbean Sea. The San Juan is the only one which is of any importance for navigation. The climate throughout the greater part of the country is healthful, especially in the higher parts of the interior, where it is cooler and drier than on the coasts. In some parts of the country the rainfall is over 200 inches in the year, while on the Pacific coast it is less than 80 inches.

Veins of copper, gold and silver occur, but only the gold mines are worked to any extent. The vegetable productions include indigo, sugar, coffee, tobacco, cacao, cotton, maize, rice, bananas and rubber. Fruits of various kinds are plentiful, and fine oranges and lemons are pro-

duced. One of the principal sources of wealth consists in cattle, of which there are great numbers, the high plain affording excellent pasturage. The principal exports of Nicaragua are coffee, hides, dyewood, bananas and indigo. Transportation facilities are poor, there being only about 175 miles of railroad in operation and few good roads in the interior. This deficiency is in part remedied by the steamship line on San Juan River and Lake Nicaragua.

The Republic is governed by a president elected every four years and a congress of one house, elected every two years by universal suffrage. Education is in a very backward state, the majority of the people being illiterate. While Roman Catholicism is the State religion, there is complete freedom of worship. The chief towns of Nicaragua are Managua, the capital; Leon, the largest city, and Granada. Population in 1910, estimated at 600,000, the majority of whom are indians, mulattoes and negroes.

Nicaragua, LAKE, an extensive sheet of water in Central America, in the Republic of Nicaragua, about 100 mi. long from northwest to southeast and about 45 mi. wide at its broadest point. It is about 110 feet above the Pacific, from which it is separated by a strip of land 13 miles wide. The river San Juan flows from the southeastern extremity into the Caribbean Sea, and at its northwestern extremity the lake receives, through the Tipitapa River, the waters of Lake Managua. Lake Nicaragua contains several islands, the largest of which is Ometepe. For the proposed use of Lake Nicaragua as a part of the interoceanic canal, see NICARAGUA CANAL.

Nicaragua Canal, a canal projected across the Isthmus of Nicaragua, to connect the



Atlantic and Pacific oceans. As originally surveyed, this canal was to extend from Greytown, on the Caribbean Sea, to Brito, on the

Pacific Ocean. The length was 183.86 miles, of which 70.51 was to be through the San Juan River and Lake Nicaragua. In 1849 a concession for constructing a canal was granted a company headed by Cornelius Vanderbilt. However, nothing practical was accomplished for forty years. In 1889 the Maritime Canal Commission was organized, and this was followed in 1899 by the Walker Commission, authorized by Congress to investigate thoroughly the route and to report upon the practicability of the enterprise. This commission made a favorable report, and for a time it seemed probable that the canal would be constructed in accordance with its recommendation. However, before negotiations with Nicaragua were completed in 1902, the Panama Canal Company of France offered to sell its franchises and property to the United States for the valuation placed upon them by the canal commission. This offer was accepted, and interest was transferred to the Panama Canal (See PANAMA CANAL.)

Nic'colite. See COPPER-NICKEL.

Nice, *nees*, a city and seaport of France, capital of the Department of Alpes-Maritimes, situated on the Mediterranean, near the base of the Alps, 84 mi. n. e. of Toulon. Its location is beautiful, and as the climate is mild and invigorating, the city is very popular as a health resort during the winter. There are two divisions of the town, the old and the new, the former comparatively unattractive, with its narrow, crooked streets; the latter made beautiful by many handsome squares and public buildings. The Casino, the cathedral, the theaters and the public library are among the most noteworthy buildings of the city. Nice possesses silk, cotton and paper mills, oil mills and manufacturing of tobacco, leather, soap, wine and straw hats. Previous to 1860 Nice belonged to Italy, but in that year it was ceded with other territory to France, as reward for her aid to Italy in the war against Austria. Population in 1911, 142,940.

Nice, COUNCILS OF, ecclesiastical councils held at Nice, or Nicaea, in Asia Minor, in 325 and 786. The object of the first council of Nice, which was convened by Constantine, was to settle the controversies which had arisen in regard to the doctrine of the Trinity. The session lasted about two months. A creed was adopted which in its later form is known as the Nicene Creed. The council of 786 was summoned by Empress Irene, with the concurrence

of the pope, and decreed that images were to be used as aids to devotion. See ICONOCLASTS.

Nicene, *ni'seen* or *ni'seen'*, **Creed**, a summary of the chief tenets of Christian faith, adopted by the Council of Nice in 325 A. D. Its essence is the expression of the belief that "Christ is of the same substance with the Father."

Nicholas I Pavlovitch, *nik'o las pahv'lovich*, (1796-1855), emperor of Russia, ascended the throne in 1825, on the death of his brother, Alexander I. He made war on Persia; joined in the Treaty of London, which secured the independence of Greece, and took part with the allied powers in the destruction of the Turkish fleet at Navarino in 1827. This affair led to war between Russia and Turkey, in which the latter was defeated. Nicholas suppressed the Polish insurrection, which broke out in 1830, with relentless severity, and in 1848 he assisted Austria in putting down the rising in Hungary. Early in 1852 began the Russian effort to take over the holy places and assume the protectorate of the Greek Church. This led to the Crimean War, before the close of which Nicholas died.

Nicholas II (1868-), emperor of Russia, eldest son and successor of Alexander III. His mother, the Empress Marie, was the sister of Queen Alexandra of England, whose son, George V, is therefore first cousin to Nicholas. He was carefully educated, and traveled extensively before his accession to the throne in 1894. At the outset of his reign, he showed himself an energetic, if autocratic, ruler, but his insistence on a policy of Russification of Poles, Finns and other aliens does not extend to the extreme violence of his father. Nicholas was married in 1894 to Princess Alexander Alix of Hesse, whose sister married Prince Henry of Prussia, brother of Emperor William II. Himself a man of peace, happiest in the family circle, Nicholas faced many troubles during his reign (see RUSSIA, subhead *History*.) For an account of the great wars in which Russia was involved, see RUSSO-JAPANESE WAR; WAR OF THE NATIONS. (See illustration on next page.)

Nicholas, SAINT (?-326), a saint greatly revered in the Roman Catholic Church, on account of the many miracles he is supposed to have wrought. From early times, feasts were held in his honor in England and in Germany, and the sixth of December is still held sacred to him in Germany. His feasts became confounded with the Christmas festivities, and Saint Nicholas, or Santa Claus, as he is called in

Nicias

Dutch, came to be regarded as the patron saint of Christmas.

Nicias, *nish'ē as*, an Athenian statesman and general, active during the Peloponnesian War. He was one of the leaders of the aristocratic party, and he was the opponent, after the death of Pericles, of the demagogue Cleon. In the campaigns against the Spartans, he met with some successes, and in 421 he brought about a peace between Sparta and Athens, which was



NICHOLAS II

known as the Peace of Nicias. When, in 415, he was appointed one of the leaders in the expedition against Sicily, he used his influence to prevent the expedition, but in vain. His fleet suffered a defeat, and his troops, retreating across Sicily, were forced to surrender. Nicias himself was put to death by the Syracusans (413 B. C.)

Nick'el, a metal of a white color, of great hardness, always magnetic, and when perfectly pure, malleable and ductile. It is, however, very hard to purify. It unites in alloys with gold, copper, tin and arsenic, which metals it renders brittle. With silver and iron, its alloys are ductile. Nickel is found in all meteoric stones, and deposits of ore occur in various countries of Europe, but the most important mines are at Sudbury, Ontario, from which more than half the world's supply is obtained. Nickel, mixed with brass in varying proportions, is now well known and largely used as German silver, or

Nifheim

nickel silver. It is also used for small coins and in electroplating. See PLATING.

Nicobar, *nik o bah'r*, **Islands**, a group of islands in the Indian Ocean, at their nearest point 130 mi. from Sumatra. With the Andaman Islands, they form an extension of the volcanic chain which includes Sumatra and Java. The area of the largest of the islands is 337 square miles; the area of the whole group is 635 square miles. The soil is fertile, and cocoanuts, oranges, sugar and bamboo grow in abundance. The inhabitants depend for their support largely on the trade in cocoanuts and copra. Population in 1911, 7000.

Niebuhr, *ne'boor*, BARTHOLD GEORG (1776-1831), a German statesman and historian. After serving for a time under the Danish government, he moved in 1806 to Berlin and there entered the Prussian service. In 1810 he was appointed historiographer royal, and delivered at the University of Berlin a course of lectures on Roman history, which were afterward published in two volumes. During the six years which he spent in Rome as Prussian minister to the papal court, he occupied himself with historical research, and the result of this was his important work, *The History of Rome Down to the First Punic War*. The great value of this book lies in the fact that it was the first in which truly critical methods were applied to Roman history.

Niemen, *ne'men*, a river of Russia and Prussia, which rises near the city of Minsk, in Russia, flows westward, then northward between West Russia and Poland, then westward again into Prussia, where it is known as the Memel. It empties into the Kurisches Haff, after a course of about 550 miles. It is navigable for about 450 miles.

Nietzsche, *ne'cheh*, FREDERICK (1844-1900), a German philosopher, born at Rocken, Saxony, and educated at Bonn and Leipzig. From 1869 to 1879 he was a professor at Basel, and for the next ten years devoted himself largely to writing; but from 1889 until his death he was insane. Nietzsche accepted the doctrine of evolution and held that the end of existence is to produce a superior race, all else being valueless; he held religious beliefs to be of passing value only, and declared they must be overthrown before there could be real progress. Among his principal books are *Thus Spake Zarathustra* and *Beyond Good and Evil*.

Nifheim, *nif''v'hime*, in Scandinavian mythology, the region of endless cold and everlasting

Niger

night, ruled over by Hel. Besides the wicked, all those who died of sickness or of old age were cast into Niflheim, and as existence there, even for the good, was but a negative sort of happiness, many men and women preferred to put themselves to death rather than to meet the inglorious fate of dying in their beds.

Niger, *ni'jur*, or **Jol'iba**, a great river of western Africa, after the Nile and the Kongo the largest of that continent. It rises on the inner frontiers of Sierra Leone and Liberia, flows north and northeast, then turns southeast and south, until by various channels it enters the Gulf of Guinea. Its total length is about 2500 miles. At different points in its course, it is known under various names, such as Joliba, Issa, Mayo and Kwara, or Quorra. At Sego, about 340 miles from its source, it enters upon a fertile tract of country, which continues until Timbuktú is reached. Here large islands divide the river channel, and its tendency is to spread over the flat country in a network of small streams. Below Timbuktú it narrows to a width of 300 feet and flows through a rocky gorge. After flowing for a time through a desert region, it enters a fertile and populous territory. Near Abo, about 80 miles from the sea, the great delta of the Niger begins. This delta extends along the coast for about 150 miles and is intersected by a network of channels and islands, the chief mouths being the Nun, the Forcado and the Bonny. The Nun is the only one of the mouths which is navigable for large vessels. The Niger River was first explored by Mungo Park in 1796 and 1797.

Nigeria, *ni je're a*, the name of a large region lying on the west coast of Africa and bordering on the Gulf of Guinea. It is bounded on the w. by Dahomey, on the n. by the Sahara, on the e. by German Kamerun and on the s. by the Gulf of Guinea. Lake Tchad touches the northeast corner. The area of the country is about 400,000 square miles, and it is estimated to contain 20,000,000 people, who are divided among a large number of native kingdoms. Among the peoples are Hausas and Kotos. The Hausas are the most advanced of these peoples. Nigeria is now under British control and for administrative purposes has been divided into Northern Nigeria, occupying about three-fourths of the region, and Southern Nigeria, including the southern fourth of the country. The Niger River flows across the western portion. Much of the country is covered with dense forests and produces gums, various kinds

Nightingale

of balsams, palm oil, ivory, india rubber, indigo and other tropical products. The seat of government of Northern Nigeria is Zungeru, and of Southern Nigeria, Lagos.

Night Hawk, in the United States the name of a bird closely related to the whip-poor-will and strongly resembling it in many ways. It has an exceedingly vigorous flight and takes its prey, consisting of beetles and other large insects, on the wing, usually in the evening. It may then be seen flying rapidly, making long descending swoops, with a hoarse whirring of its wings. The night hawk spends the day quietly sitting on the ground. Its eggs, two in number, are laid on the bare ground, with no attempt at protecting them by a nest.

Night Heron, a small, restless bird, not graceful like the true heron. It is found in the United States and over Europe, Asia and Africa. It breeds in large flocks in the northern part of the United States, where it builds a coarse nest on a bush or tree, returning to the same one year after year. The night herons are timid creatures, and as their young are esteemed as food, they have been much hunted during the breeding season.

Nightingale, a well-known bird of the thrush family, found in Europe, Asia and



NIGHTINGALE

Africa. It is a little brown creature, not much larger than our bluebird, and is everywhere famous for the beautiful night song of the male during the breeding season. On moonlight nights it often sings in woods and shrubbery till long after midnight, but in the daytime it is shy and rarely seen or heard. The bird is referred to in the poetry of all countries and is spoken of by its classical name, philomel, or its eastern name, bulbul.

Nightingale, FLORENCE (1820-1910), an English philanthropist, born in Florence, Italy.

Nightmare

At an early age she became interested in hospital work, visited the chief military hospitals in Europe and studied the nursing systems. During the Crimean War the hospital accommodation was found to be very defective, and Miss Nightingale promptly volunteered to organize a band of nurses at Scutari. The offer was accepted by the government, and within a week she was on her way to the East, where she rendered invaluable service to the sick and



FLORENCE NIGHTINGALE

wounded by her incessant labors in nursing and in hospital reform. The strain, both mental and physical, which this work demanded, permanently injured her health; yet, notwithstanding her confinement to a sick room, she continued to give her assistance in the interest of hospital reform, and for this purpose she was consulted during the Civil War and the Franco-German War. She published *Notes on Hospitals*, *Notes on Nursing*, *Notes on the Sanitary State of the Army in India* and *Life or Death in India*.

Night'mare, a state of oppression, or a feeling of suffocation, which sometimes comes on during sleep, and is accompanied by intense anxiety, fear or horror. The sufferer feels an enormous weight on his chest and dreams that he is pursued by a phantom or wild beast or that he is threatened by some other danger,

Nihilists

from which he can make no motion to escape. After a short time he awakens in a state of great terror, often with his body dripping with perspiration. It is supposed that the immediate cause of nightmare is some irregularity in the circulation of the blood in the chest or brain, caused by indigestion or by a strained or unnatural position of the body.

Night Schools. See EVENING SCHOOLS.

Night'shade, the English name of various species of plants, chiefly of the genus *Solanum*, to which the potato belongs. The woody nightshade, or bittersweet, and the common, or garden, nightshade, are British plants, the first growing in hedges and among bushes, and the latter in gardens, fields and waste places. The *black nightshade* bears small black berries and small heads of white flowers. It is poisonous and narcotic and has also been employed medicinally. The name is sometimes applied to other plants; for instance, the belladonna, which is often called the *deadly nightshade*.

Ni'hilists, the name at first applied specifically to the revolutionary party in Russia who accepted anarchism (See ANARCHISTS), but now applied indiscriminately to Russian revolutionists. This name was first given to the party about 1860 by Tourgenieff in his stories of Russian society. Their object was to destroy all forms of government, overturn all institutions, annihilate all class distinctions and sweep away all traditions. For some years this propaganda was spread in printed and oral forms among the serfs by thousands of young people of both sexes. About 1874, however, the Russian government began to interfere, the newspapers which advocated the Nihilist doctrine were suppressed and large groups of the revolutionists were summarily tried and condemned to death or exile. Thereafter the Nihilists adopted a secret and bloody program. The first startling indication of the new departure was the murder of high officials. The incendiary followed the assassin. In June, 1879, no fewer than 3500 fires broke out in Saint Petersburg and other large towns, most of which were attributed to the Nihilists. Various attempts were made to assassinate the emperor, and at last, in 1881, Alexander II was murdered by a bomb thrown beneath his carriage in the street near the palace. This terrible act seemed to exhaust the fury of the Nihilists, and since that time their doctrines have been similar to socialism and have been more peaceably promulgated.

Niigata

Niigata, *ne'e gah'ta*, a city and port of Japan, situated on the west coast of the island of Hondo, at the mouth of the Shinano. It is a well-built town, and many of its streets are traversed by canals. The port was opened to foreign commerce by the treaty of 1858, but the obstructed state of the river, the open anchorage and the severe winters have hitherto prevented the development of much trade. There is, however, a considerable coasting trade in petroleum. Population in 1908, 61,616.

Nijmegen, *ni'ma gen*. See NIMEGUEN.

Nijni-Novgorod, *nyeezh'nye nov'go rod*. See NIZHNI-NOVGOROD.

Ni'ke Apteros or **Athene Nike**, TEMPLE OF, a beautiful temple of the Doric order, standing on the site of the entrance to the Acropolis at Athens, built in the Age of Pericles and consecrated to Athene. It is 18 by 27 feet and has four Ionic columns, 13½ feet in height, in the front and rear. The frieze contains sculptures representing historical and mythological scenes. The building was torn down by the Turks in the last part of the seventeenth century, but in 1835 it was rebuilt, the missing parts being filled in.

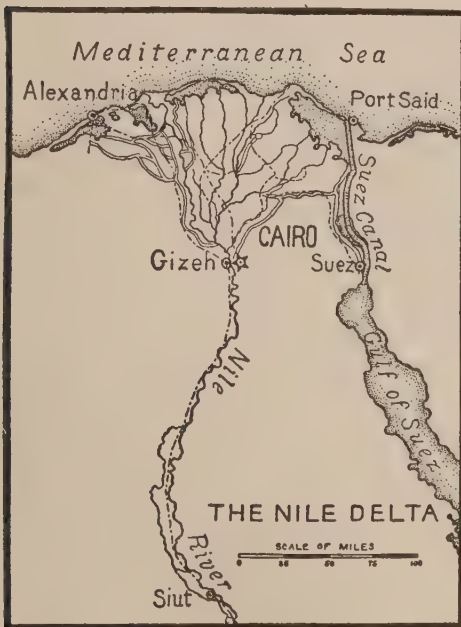
Nile, a great river of Africa, the main stream of which, known as the Bahr-el-Abiad, or White

Niles

Nile at Khartum. The Nile, near where it flows out of Lake Victoria, forms the unimportant Ripon Falls, then flows generally northwest and afterward forms the Falls of Karuma and the Murchison Falls. Then, after a further course of 30 miles, it enters another lake, the Albert Nyanza, at an elevation of about 2300 feet. From the Albert Nyanza to the Mediterranean the general course of the Nile is in a northerly direction, with numerous windings. Above Gondokoro the river forms a series of cataracts; but between these falls and the Albert Nyanza, a distance of over 150 miles, the river is broad, deep and navigable. Not far below Gondokoro the Nile begins to flow more to the west, until it reaches Lake No, where it receives the Bahr-el-Ghazal, one of its chief tributaries. On receiving this affluent it turns due east for about 100 miles, and then, after receiving the Sobat from the southeast, it flows almost due north to Khartum. It receives its last tributary, the Atbara, from the Abyssinian frontier. Between this point and the frontiers of Egypt occur several rapids or cataracts, presenting greater or lesser obstacles to navigation. In Egypt, at the head of the Delta, near Cairo, the river divides into two main branches, leading down respectively to Rosetta and Damietta, where they enter the Mediterranean.

As rain scarcely ever falls in the greater part of the valley of the Nile, the river owes its supplies to the copious rains and the vast lake areas of the tropical regions in which it takes its rise, and its volume thus depends upon the season. It begins to increase in June, attains its greatest height about September and then subsides as gradually as it rose. The ordinary rise at Cairo is about forty feet. During the flood a great portion of the Delta and of the valley of Egypt is inundated. This annual inundation, with all the rich soil which it brings, is the reason for much of the fertility of Egypt, and no doubt it was for this reason that the Nile was worshiped as a god, alike by Egyptians, Greeks and Romans. The total length of the river is estimated at about 3670 miles, or rather less than that of the Mississippi-Missouri. The dotted lines in the accompanying map indicate the route of the Cape-to-Cairo railway and its connections.

Niles, OHIO, a city in Trumbull co., 58 mi. s. e. of Cleveland, on the Mahoning River and on the Erie, the Pennsylvania and other railroads. It is a manufacturing place, producing mining and mill supplies, galvanized iron,



Nile, has its chief source in the equatorial lake Victoria Nyanza. What is known as the Blue Nile, a much smaller stream, joins the White

foundry products, automatic presses, railroad cars, incandescent lamps and various other articles. The place was first incorporated in 1864. Population in 1910, 8361.

Nilsson, *nil'son*, CHRISTINE (1843-), a Swedish soprano, born at Hassaby, in Sweden. Accompanied by her brother, she used to sing at village fairs and places of public resort, where she also played on the violin. In 1857 her talent attracted the attention of a wealthy gentleman, who had her educated as a singer at Stockholm and afterward at Paris. In 1864 she made her first professional appearance, in *La Traviata*, at Paris, and was received with enthusiasm. On several occasions she sang in America with the utmost success. In 1872 she married M. Auguste Rouzaud, who died in 1882; in 1886 she married Count Miranda.

Nim'bus, a term applied in art, especially in sacred art, to a kind of halo, or disk, surrounding the head, in representations of divine or sacred personages. It was first used in Christian art in the fifth century and took various forms. The nimbus in representations of God the Father is of a triangular form, with rays diverging from it in all directions; the nimbus in representations of Christ contains a cross more or less enriched; that of the Virgin Mary consists of a circlet of small stars, and that of angels and saints of a circle of small rays. When the nimbus is of a square form it indicates that the person was alive at the time of delineation.

Nimeguen, *nim'e gun*, a city in the Province of Gelderland, in the Netherlands, delightfully situated on the slopes of several hills, which stretch down toward the Waal. It has a fine old church and a Renaissance townhall of the sixteenth century. The industrial occupations include tanning, brewing and the manufacture of eau de cologne, cotton goods and metal goods. The town is celebrated for the treaties of peace concluded there, in 1678, between France and Holland and Spain, and in 1679, between the German Empire and France. Nimeguen was formerly a strong fortress, but the fortifications have been demolished. Population in 1911, 57,116.

Nimes or **Nismes**, *neem*, a city of France, capital of the Department of Gard, 174 mi. s. s. w. of Lyons. It has an ancient cathedral, an old citadel and a number of striking public buildings. It is chiefly noted, however, for its Roman remains, which include a temple 76 feet long and 40 feet wide, ornamented with Corinthian columns. This temple contains a collec-

tion of Roman relics. The manufactures of Nimes are chiefly of silk and cotton goods. It has a considerable commerce and is the great center of southern France for trade in silks. The city is supposed to have been founded by a Greek colony, and was for about five hundred years in the possession of the Romans, under whom it attained considerable importance. In the sixteenth century it became a stronghold of Calvinism, and it suffered much during the civil wars. Population in 1911, 80,437.

Nim'rod is described in *Genesis* x, 8-12, as a descendant of Ham, a son of Cush, a mighty hunter before the Lord.

Nim'rud, the name given to the site of an ancient Assyrian city, situated in an angle formed by the Tigris and the Great Zab, about 20 mi. s. of the ruins of Nineveh. It is one of the group of great cities which clustered around Nineveh, and it has been supposed from inscriptions found in the ruins that it is identical with the Calah mentioned in *Genesis* x, 11.

Nin'veh, an ancient city, capital of the Assyrian Empire, in Asiatic Turkey, on the left bank of the Tigris, opposite the town of Mosul (See ASSYRIA). It remained the capital of Assyria until about 606 B. C., when it was taken and destroyed by the Medes and Babylonians. Local tradition maintained that Nineveh was buried on the left bank of the Tigris, but the fact was not settled until in 1842 Botta began excavations in the vast mounds there. He was followed in his work by Layard and later by Loftus, Hormuzd Rassam and George Smith, and the most extraordinary results were obtained. Vast palaces, a royal library, sculptures and innumerable small objects of every kind have been uncovered, and the walls of the city with their elaborate outworks, moats and defenses can still be traced. The movable relics have been deposited in the British Museum.

Ning'-po', a city of China, in the Province of Che-kiang, one of the ports open to foreign commerce. It is on the Tatsish River, about 12 miles from the sea. It is surrounded by a wall 25 feet high, and its most remarkable edifice is the great Ning-po pagoda, now partly in ruins. The manufactures consist chiefly of silk and cotton goods, carpets, furniture, gold and silver wares and confections. The principal exports are tea, silk and raw cotton; the principal imports, sugar and opium. Population in 1911, estimated at 350,000.

Niobe, *ni'o be*, in Greek mythology, the daughter of Tantalus, married to Amphion,

Nipigon

king of Thebes. Proud of her numerous children, she provoked the anger of Apollo and Diana by boasting to their mother, Latona, who had but the two children. She was punished by having all her children put to death by those two deities, and she herself was changed by Jupiter into a stone, which shed tears during the summer. This fable has afforded a subject for art and has given rise to the beautiful group in the tribune at Florence, known by the name of *Niobe and her Children*.



NIOBE

group in the tribune at Florence, known by the name of *Niobe and her Children*.

Nip'igon or **Nepigon**, a lake of Canada, in Ontario, about 30 mi. n. w. of Lake Superior. Its greatest length is 70 miles, and its width, about 40 miles. It has rugged headlands, deep bays and many islands. The Nipigon River connects it with Lake Superior.

Nip'issing or **Nepissing**, a lake of Canada, in Ontario, n. e. of Lake Huron. Its coast line is very irregular. Its length is about 55 miles, its greatest breadth, 20 miles. It contains numerous islands, and finds its only outlet by French River into the Georgian Bay.

Nip'pon, the former name of Japan. See JAPAN.

Nip'pur, an ancient city of Babylonia, situated about 50 mi. s. e. of Babylon, between the Euphrates and the Tigris. The University of Pennsylvania has carried on extensive excavations at this place and has obtained a large collection of cuneiform inscriptions. The present name of the place is Nuffar.

Nirvana, *neer vah'na*. See BUDDHISM.

Ni'san, a month of the Jewish calendar, the first month of the sacred year and the seventh of the civil year, answering nearly to our March. It was originally called Abib, but was called Nisan after the Captivity.

Nismes, *neem*. See NIMES.

Ni'trate, a salt of nitric acid. The nitrates are generally soluble in water and are easily decomposed by heat. The most valuable of these is silver nitrate (See LUNAR CAUSTIC). The nitrates of lead and of iron are used in medicine, and the nitrates of barium and stron-

Nitrobenzol

tium are employed in the manufacture of fireworks (See SALTPETRE). Deposits of nitrates are present in small quantities in almost all soils, and enormous accumulations of nitrate of soda exist in Chile and Peru. These latter deposits, which are known as Chile saltpetre, or cubic nitre, are found near the coast and have been produced from remains of marine animals and birds. The great value of this nitrate is in its application in agriculture, as a fertilizer of impoverished soil; for it is now well known that crops require large quantities of nitrogen to secure their full development. The nitrates should not be used on light, porous soils where the rain will sink the manure below the range of the roots.

Nitre, *ni'tur*. See SALTPETRE.

Ni'tric Acid, an important and powerful compound, formed of hydrogen, oxygen and nitrogen. When pure, it is a colorless liquid, very strong and disagreeable to the smell and so acid that it cannot be safely tasted unless much diluted. It is known in the arts as *aqua fortis*, and it is commonly obtained by distilling nitre (potassium nitrate) or Chile saltpetre (sodium nitrate) with strong sulphuric acid (See SALTPETRE). Nitric acid contains about 76 per cent of oxygen, a great part of which it readily gives up to other substances, acting thus as a powerful oxidizer. Thus, many metals, such as copper, tin and silver, when brought into contact with this acid are oxidized at the expense of the acid, with the production of lower oxides of nitrogen and metallic salt. Nitric acid, when moderately dilute, acts on organic bodies so as to produce a series of most useful substances, notably, acetic, oxalic and picric acids and isatin, or white indigo. By replacement of the hydrogen in nitric acid, a series of salts termed *nitrates* is obtained. When nitrates are heated with combustible bodies, an explosion is generally produced (See NITRATE). A mixture of strong hydrochloric and nitric acids is known as *aqua regia*, *nitromuriatic* or *nitrohydrochloric acid*. Nitric acid is employed in etching on steel or copper; as a solvent of tin, to form with that metal a mordant for some of the finest dyes; in metallurgy and assaying, and in medicine—in a diluted state, as a tonic and as a substitute for mercurial preparations and in the form of vapor, to destroy contagion.

Ni'troben'zol, a liquid prepared by adding benzol drop by drop to fuming nitric acid. It closely resembles oil of bitter almonds in flavor and is largely employed as a substitute for that

oil in the manufacture of confectionery and in the preparation of perfumery. It is important as a source of aniline (See ANILINE).

Nitrogen, *ni'tro jen*, an important elementary substance, the basis of nitric acid and the principal ingredient of atmospheric air. It is a colorless, invisible gas, called by Lavoisier *azote*, because it is incapable of supporting life. The name nitrogen was applied to it by Chaptal, because of its entering into the composition of nitre, nitric acid and other similar substances. About four-fifths of the volume of the atmosphere is nitrogen, the rest being principally oxygen. Nitre is nearly 13 per cent by weight nitrogen. Nitrogen is inodorous, tasteless and incombustible and is a very inert substance in itself, although many of its compounds, such as nitric acid and ammonia, are possessed of great chemical activity. By reason of its inertness and general slowness of chemical action, it dilutes the oxygen in the atmosphere and serves to moderate the otherwise too violent action of the latter gas. Under certain circumstances nitrogen may be induced to combine with other elements, especially with hydrogen, oxygen, carbon, titanium, tantalum and tungsten. The oxides of nitrogen are five in number. These oxides may be all produced from nitric acid. The *trioxide* forms a dark blue liquid, which, when added to water at 0°, combines therewith, forming *nitrous acid*. This solution acts as a reducing agent, inasmuch as it eliminates gold and mercury as metals from several of their salts; on the other hand, it also exercises an oxidizing action on such salts as ferrous sulphate and potassium iodide. By replacement of the hydrogen in nitrous acid, a series of metallic salts is obtained, called *nitrites*. Nitrogen monoxide or nitrous oxide is better known by the name of "laughing gas" (See LAUGHING GAS).

Nitroglycerine, *ni'tro glis'ur in*, an explosive substance, appearing as a colorless or yellowish, oily liquid, heavier than water. It is insoluble in water, but dissolves in alcohol or ether. It is prepared by adding glycerine to a cooled mixture of sulphuric acid and fuming nitric acid. The liquid is poured into ten or twenty times its bulk of cold water, when the heavy nitroglycerine sinks to the bottom. When violently struck, nitroglycerine explodes. The volume of gas produced is about 10,000 times the initial volume of the nitroglycerine. The explosive force of nitroglycerine compared with that of an equal volume of gunpowder is as thirteen to one, and it is the strongest explosive known. If any

traces of acid are allowed to remain in nitroglycerine, it is liable to undergo spontaneous explosion; hence, it is an exceedingly dangerous article to transport or store, and it is advisable to prepare the substance on the spot where it is to be used and only in such quantities as may be required for immediate consumption. This method is adopted in many quarries and engineering undertakings. Nitroglycerine has for some time been extensively used in the manufacture of dynamite and smokeless powder. See BLASTING; DYNAMITE; SMOKELESS POWDER.

Nit'rous Acid. See NITROGEN.

Nitrous Oxide. See LAUGHING GAS.

Nivose, *ne voze'*, (snow-month), the name given in the French revolutionary calendar to a winter month, beginning December 21 and ending January 19.

Nix, in German mythology, the name given to water spirits, male or female. The male nixie is sometimes represented as old, sometimes as young, but generally as a malicious being. The female nixie appears as a maiden, who often falls in love with some young man, whom she entices or draws into the water.

Nizhni-Novgorod, *nyeezh'nye nov'go rod*, or **Nijni-Novgorod**, a town of Russia, capital of the government of the same name, at the confluence of the Volga and Oka rivers, 265 mi. e. n. e. of Moscow. The town is divided into three parts, the upper district, including the citadel; the lower portion, and the suburbs, occupied by the great annual fair and containing thousands of stone shops, besides other structures for the accommodation of the fair. This fair, instituted in Nizhni-Novgorod in 1817, is held in the latter part of the summer and attracts an immense multitude of people from all parts of Russia and many parts of Asia. The annual value of the sales is estimated at something over \$80,000,000. Population, about 95,000, which is more than doubled at the time of the fair.

No'ah, one of the patriarchs of the Old Testament, son of Lamech, described in the book of *Genesis* as being chosen by God for his piety to be the father of the new race which should people the earth after the deluge. Having been warned by God of the coming flood, he built a vessel (the Ark) according to God's direction, and entered it with his family and all kinds of animals. After the waters had subsided the Ark rested on Mount Ararat, where Noah gave a thank offering to God and was assured that the

earth should never again be destroyed by a flood. As a sign of this promise, God set the rainbow in the clouds. Noah, or the family he represented, lived 350 years after the flood. While modern accounts place Mount Ararat in Armenia, older traditions locate it in the mountains of the Kurds, east of the Tigris.

Nobel Prizes, a series of prizes founded by Alfred Bernard Nobel, a Swedish inventor most widely known for his invention of dynamite (See DYNAMITE). Mr. Nobel bequeathed \$9,000,000, the income from which is to be annually distributed in five equal prizes awarded for (1) the most important invention or discovery in physics; (2) the most important discovery or improvement in chemistry; (3) the most important discovery in physiology or medicine; (4) the most remarkable literary work of an idealistic nature; (5) the best work done in the interest of universal peace. The prizes amount to \$40,000 each. The first four are awarded by the Swedish Academies, and the fifth by the Norwegian Storting. The first prizes were awarded in December, 1901. Four Americans have received prizes: Theodore Roosevelt in 1906 for his work in the interest of universal peace; Professor A. A. Michelson of the University of Chicago in 1907 in physics; in 1912 Dr. Alexis Carrel of the Rockefeller Institute in medicine and Elihu Root for his services in the interest of peace.

Nobility a rank or class of society which possesses hereditary honors and privileges above the rest of the citizens. Such a class is found in the infancy of almost every nation. Its origin may be attributed to military supremacy, superior ability or religious precedence.

Among the ancient Romans, the patricians originally formed the nobility; but a new order of nobility arose out of the plebeian, consisting of those who had held curule magistracies and their descendants (See CURULE MAGISTRATES). Among the ancient German tribes, only obscure traces of hereditary nobility are found. The dignities of the counts of the Franks, the aldermen and great *thanes* of England, as also the *jarls* (in England, *eorlas*) of Denmark, were accessible to every one distinguished by merit and favored by fortune. In Venice a nobility grew up consisting of a series of families who gradually acquired all political power.

In England hereditary nobility, that belonging to the titles of duke, marquis, earl, viscount and baron, is now entirely personal, though formerly it was connected with the holding of lands. In Spain and Italy still, the same rank depends in

greater measure upon property, and in France and Germany, the *de* and *von* of titles point to the same fact. In these countries, nobility is common to all members of the noble family, and the German nobility form a very exclusive caste. In France and Germany the nobles long formed a class of petty sovereigns within their own domains. The French Revolution first deprived the nobles of that country of their privileges and exclusive rights, and the decree of June 19, 1790, abolished hereditary rank entirely. Under Napoleon I arose a new hereditary nobility, with the titles of princes, dukes, counts, barons and chevaliers, which descended to the eldest sons. After the restoration of the Bourbons (1814) the ancient nobility reclaimed their former rights and privileges. Nobility was again abolished in 1848, but it was restored by Napoleon III. In Norway the Parliament abolished nobility by three successive decrees of 1815, 1818 and 1821.

Node, in astronomy, one of the points in which two great circles of the celestial sphere, such as the ecliptic and the equator, or the orbits of the planets and the ecliptic, intersect each other. The node at which a heavenly body passes or appears to pass to the north of the plane of the orbit, or great circle, with which its own orbit or apparent orbit is compared, is called the *ascending node*; that where it descends to the south is called the *descending node*. At the vernal equinox the sun is in its ascending node, at the autumnal equinox it is in its descending node. The straight line joining the nodes is called the *line of the nodes*. The *lunar nodes* are the points at which the orbit of the moon cuts the ecliptic.

Nogi, *no'ge*, KI-TEU, General Baron (1851-1912), a Japanese general and administrator, famous for his successful siege of Port Arthur during the Russo-Japanese War, extending from May, 1904, to January 1, 1905. He was a member of the famous Samurai caste of feudal Japan, and after the reorganization of the country he entered the army and won distinction in the Satsuma Rebellion, in which he was twice seriously wounded. After the Japanese-Chinese War of 1895 he was made governor of the island of Formosa, which was ceded by China to Japan as a result of that struggle, and showed remarkable ability as an administrator. At the outbreak of the Russo-Japanese War he was placed in command of the third army and was assigned the task of reducing Port Arthur, considered one of the most strongly fortified

ports in the world. After the fall of that fortress he joined Oyama's force and took a conspicuous



GENERAL NOGI

part in the great Battle of Mukden. In 1912 he, with his wife, committed suicide by the *hara-kiri* method, because of the death of Emperor Mut-suhito. See *HARA-KIRI*.

Nome, a city and mining camp of Alaska, 13 mi. w. of Cape Nome, on the shore of Norton Sound. When gold was discovered on the coast near this point, a town immediately sprang up. At first this was but a city of tents, but as soon as possible a regular city was laid out. In 1900 it was a city of over 12,000 inhabitants, and maintained fire and police departments and sewage and telephone systems, but with the decline of mining operations most of the inhabitants moved away. Population in 1910, 2600.

Nonconformists, those who refuse to conform to an established church. The name was first applied to those English clergymen who, at the Restoration, refused to subscribe to the Act of Uniformity and were in consequence ejected from their livings. Relief was afforded by the Toleration Act of 1689. The repeal of the Corporation and Test acts in 1828 removed the civil disabilities under which Nonconformists had previously been placed.

Nones, *nōnz*, in the Roman calendar, the fifth day of the months January, February, April, June, August, September, November and

December, and the seventh day of March, May, July and October. The *nones* were so called as falling on the *ninth* day before the *ides*.

Non-Intercourse Act. See *EMBARGO*.

Nordau, *nor'dow*, MAX SIMON (1849-), an Hungarian physician and author, born in Budapest. After traveling in Europe he went to Paris in 1878. Later he wrote several works which received wide attention and were translated into English, but the one upon which his fame rests is known to English readers as *Degeneration*. In this he endeavors to prove that the intellectual activity and excitement of the last half century have resulted in the degeneration of once healthy mental condition into emotional sentimentality and impurity.

Nordenskjöld, *nor'den shöld*, NILS ADOLF ERIK, Baron (1832-1901), a Swedish naturalist and explorer, born in Finland. He devoted himself to science and was appointed to some important posts, but becoming obnoxious to the Russian authorities, he left Finland and settled in Sweden. On a North Polar expedition in 1868, he reached the high latitude of 81° 42'. Having turned his attention to Siberia, he decided, after making two successful voyages through the Kara Sea to the Yenisei, to attempt the accomplishment of the northeast passage, or passage by sea round northern Asia to the Pacific. He sailed in July, 1878, was the first to double the most northern point of the Old World, and after passing through Bering Strait reached Japan in September, 1879. See *NORTH POLAR EXPLORATION*.

Nordhoff, *nor'dhoff*, CHARLES (1830-1901), a celebrated journalist and author, born in Germany. He was educated at Woodward College, Cincinnati, and spent his life in the United States. He was a printer's apprentice in Cincinnati and later served nine years in naval, whaling and fishing service. He then worked in several newspaper offices, did editorial work for Harper's publishing house, the *New York Tribune* and the *Evening Post* and served as Washington correspondent for the *New York Herald*. He visited Hawaii about 1872 and traveled much in California, where he died. His writings deal with politics, philosophy, travel, his experiences at sea (as in *Man-of-War Life* and *Whaling and Fishing*) and with sociology, as in his well-known *Politics for Young Americans* and his valuable book on *The Communitistic Societies of the United States*.

Nor'dica, MADAME (1859-1914), an American prima donna, whose real name was Lillian

Norfolk

Norton. She was born in Farmington, Maine, received her first musical training at the Boston Conservatory of Music, and later studied in Italy and London. She made her debut at Brescia in 1876, and first appeared in America in 1895. She was at once pronounced a great artist, being regarded as one of the foremost sopranos of modern times.

Norfolk, nor'fawk, VA., a city of Norfolk co., 90 mi. s. e. in a direct line and 116 mi. by water, from Richmond, on the Elizabeth River, opposite Portsmouth, and on the Southern, the Atlantic Coast Line, the Sea Board Air Line, the Norfolk & Western and several other railroads. It is also the terminus of many coastwise and foreign steamship lines and has inland water communication by means of the Dismal Swamp and the Albemarle & Chesapeake canals. Norfolk has an excellent harbor and is the second city in the state and the largest port on the Atlantic, south of Philadelphia. The trade is principally in lumber, coal, grain, cotton, peanuts, oysters, vegetables and fruit. It is the fourth cotton port in the United States and the leading peanut market of the world. The most important industrial establishments are cotton-knitting mills, cotton compresses, fertilizer factories, shipyards, tobacco and cigar factories, foundries, machine shops, lumber mills and silk mills. The city has a splendid system of city schools, besides the Norfolk Academy and the Norfolk Mission College for colored students, and it contains the Saint Vincent's and the Norfolk Protestant hospitals, a public library and a large park. The old Saint Paul's Church, built in 1737, is of historic interest. Other prominent buildings are the customhouse, the city hall, the postoffice, Monticello Hotel, Atlantic Hotel and the Citizens' Bank. The Norfolk navy yard is at Portsmouth. Old Point Comfort is just north of the city.

Norfolk was organized as a town in 1682, was incorporated as a borough in 1736 and was chartered as a city in 1845. In January, 1776, about nine-tenths of the town was burned by the British under the earl of Dunmore (See DUNMORE, JOHN MURRAY). The city suffered severely from yellow fever in 1855. It was entered by Virginia troops in command of William B. Taliaferro, in April, 1861, and the navy yard was fired, but little damage was done. Until taken by the Federal forces, in May of the next year, it was the chief naval station of the Confederacy. Population in 1910, 67,452.

Normal School

Norfolk Island, an island in the South Pacific, 500 mi. n. w. of New Zealand. It is about 5 miles long and has an area of 16 sq. mi. The climate is healthful, and sweet potatoes, tropical fruits, wheat and maize are grown. The island was discovered in 1774 by Captain Cook. It is a dependency of New South Wales. The population is about 900.

Norfolk Island Pine, a tree of the genus *auracaria*, in the pine family, formerly abounding on Norfolk Island, where it attains a height of 200 feet or more, with a diameter of ten or eleven feet. Its timber is valuable, being white, tough and close-grained. It does not thrive in the open air in our latitude, but it grows remarkably well in conservatories and is one of the most beautiful of trees.

Norfolk, NEB., a city of Madison co., on the branch of the Elkhorn River and on the Chicago, Milwaukee & Saint Paul Railroad, 50 mi. n. of Columbus. Its industries include a sugar beet factory, cereal mills and other manufacturing. The North-Nebraska Insane Asylum is located here. Population in 1910, 6025.

No'ria. See PERSIAN WHEEL.

Normal School, a school organized for the professional training of teachers. In its ordinary meaning a normal school is one devoted to the preparation of teachers for elementary schools. The institutions devoted to training teachers for secondary schools and authorized to grant degrees are termed normal colleges. The first successful normal school was established by Francke, at Rheims, in 1681. A second school established by him in 1704, at Halle, still bears his name (See FRANCKE, AUGUST HERMANN). After this experiment normal schools obtained recognition in France, and in Prussia during the reign of Frederick the Great several of these institutions were established on a firm basis. They are now found in all civilized countries, where they constitute an important part of the system of public instruction. The normal schools of Great Britain are frequently termed teachers' training colleges. The British system has been extended to Australia, Canada and South Africa.

The first school in the United States devoted to the training of teachers was established at Concord, N. H., by Mr. R. S. Hall in 1823. Later, Mr. Hall established similar schools at Andover, Mass., and Plymouth, N. H. The last institution had over 250 students, and for a number of years it supplied teachers for the schools of all the surrounding towns. The first

state normal school was established at Lexington, Mass., in 1839, and the schools at Westfield and Bridgewater followed within a year. The establishing of these schools was due to the efforts of Rev. James G. Carter, Mr. Edmund Dwight, who contributed \$10,000 for the purpose, on provision that the Massachusetts legislature would appropriate an equal amount, and to Horace Mann, who was secretary of the Massachusetts board of education (See MANN, HORACE). New York, Connecticut, Michigan and Pennsylvania established similar schools within the next twenty years. By 1860 normal schools had become a part of the educational system of a number of states, and after that date the newly organized states and most of the territories provided for normal schools in establishing their systems of public education.

Qualifications for admission, courses of study and grades of work in these schools vary as widely as local conditions. Those in the old states in general have a higher standing for admission and longer and more advanced courses of study, while in the newer states the courses are for two or three years and instruction is confined to the subject-matter and methods of teaching of the common branches, together with such studies as algebra, geometry, the elements of natural science and civil government. Those normal schools which require graduation from a high school or its equivalent, for admission, confine their work almost entirely to professional training, and all normal schools now have teachers' training schools connected with them.

There are a few state institutions for higher professional training, such as the normal college at Albany, N. Y., and the one at Ypsilanti, Mich. Schools of similar grade are also associated with a number of larger universities. The most widely known of these are the Teachers' College of Columbia University, the School of Pedagogy of New York University and the School of Education of the University of Chicago. Chairs of pedagogy are also established in a number of the larger state universities. The demand for trained teachers in large cities has also led to the establishment of city training schools, such as the Normal College in New York City, the Chicago Normal School at Chicago and the Brooklyn Training School in the borough of Brooklyn, N. Y.

Norman Architecture, the round-arched style of architecture, introduced at the Norman Conquest from France into Britain, where it prevailed till the end of the twelfth century.

The more specific characteristics of churches in this style are (1) a cruciform plan, with apse and apsidal chapels, the towers placed one on each side of the façade; (2) semi-cylindrical vaulting; (3) the doorways deeply recessed, with highly decorated moldings; (4) the windows small, with semi-circular arched heads, placed high in the wall; (5) walls frequently decorated by bands of arcades, with single or interlacing arches. In course of time the style assumed a more delicate and refined character, passing gradually into the Early English. Besides ecclesiastical buildings, the Normans built many castles and fortresses, the best remaining specimen of which is the Keep of the Tower of London. The churches at Caen, Normandy, and parts of the cathedrals of Durham, Peterborough, Norwich and Canterbury, in England, afford excellent examples of this style.

Norman Conquest. See WILLIAM I, of England.

Nor'mandy, an ancient province in the north of France, now divided into the departments of Seine-Inférieure, Eure, Calvados, Manche and Orne. On the decline of the Roman Empire this territory was seized by the Franks, and afterwards, in the tenth century, it was wrested from them by the Northmen, or Normans, from whom it received its name. Charles the Simple gave his sanction to the conquest made by the Normans, and Rollo, their chief, received the title of duke of Normandy. William II, duke of Normandy, in 1066 became king of England (See WILLIAM I, of England), and Normandy was annexed to England. On the death of William it was separated from England and was ruled by his son, Robert, but it was afterward again ruled by the kings of England, until Philip Augustus took it from John and united it with France in 1203. Although it was several times retaken by the English, it was finally recovered by the French in 1449-1450. Normandy is one of the richest and most fertile parts of France.

Norman French, a dialect of old French, which, because it was the language of the Normans at the time of the Conquest, became the legal language of England. It continued to be the official speech until the time of Edward III, and it is still used in several formal proceedings of state.

Normans (north men), the descendants of the Northmen who established themselves in Northern France, hence called Normandy. The Danish Northmen invaded England first about

787, and from then there were bitter struggles oft repeated, until the Danish king Sweyn conquered the country in 1032. His son Canute ruled England until 1042, when the Saxons again gained control. William the Conqueror, who finally overthrew the Saxons in 1066, was himself a Norman (See NORTHMEN). Besides the important place occupied in history by the Normans in Normandy and England, bands of Normans established themselves in South Italy and Sicily, and Norman princes ruled there from the middle of the eleventh till the end of the twelfth century.

Norns, in Northern mythology, the three fates, representing the past, present and future. Their decrees could not be changed even by the gods, and they themselves were not regarded as responsible always for their actions. They were represented as three women, the first, old and looking constantly backward; the second, young and gazing straight ahead, the third, heavily veiled, with her head turned in the opposite direction from the first.

Norris, FRANK (1870-1902), an American novelist, author of *The Pit* and *The Octopus*. But for his untimely death he might have taken high rank among American authors, for he showed great promise. The two novels named above were part of the *Epic of the Wheat* that he had planned, to deal in a most vivid and realistic manner with the great problems of the raising and distributing of wheat. Mr. Norris was born in Chicago, was educated in California and at Harvard, studied art in Paris, served as war correspondent in South Africa and in Cuba and was literary adviser to Doubleday, Page & Co. from the establishment of that firm until his death. Among his other stories are *A Deal in Wheat*, *McTeague*, *Blix*, *A Man's Woman* and *Moran of the Lady Letty*.

Norristown, PA., the county-seat of Montgomery co., about 15 mi. n. w. of Philadelphia, on the Schuylkill River and the Schuylkill Canal and on the Philadelphia & Reading, the Pennsylvania and other railroads. The borough has a beautiful location among the hills, in an agricultural and mining section, and it contains extensive manufactures of knitting machines, hosiery, underwear, glass, iron, wire, screws, implements, furniture and other articles. It has a state hospital for the insane, the Charity Hospital, homes for girls and aged women and other charitable institutions. Some of the prominent buildings are the McCann Library, the Masonic Temple, the city hall, the county courthouse and

the prison. Montgomery Cemetery contains the tomb of Winfield Scott Hancock. Valley Forge is about six miles to the northwest, and there are other places of historical interest in the vicinity. It was settled about 1688 and was incorporated as a borough in 1812. Population in 1910, 27,875.

North, FREDERICK, Lord, Earl of Guilford (1732-1792), an English statesman who is connected with American history as chief of the British administration during the American Revolution. He became prime minister in 1770 and proved, while honest and well meaning, so subservient to George III that he sometimes carried out a policy of which he did not thoroughly approve. The placing of a duty on tea sold in the American colonies, and the Boston Port Bill were among the measures which he vigorously supported.

North Adams, MASS., a city in Berkshire co., 21 mi. n. of Pittsfield, on the Hoosac River and on the Boston & Maine and the Boston & Albany railroads. It has a beautiful location in the Berkshire Hills, at the foot of Greylock, the highest peak in the state. The Hoosac Tunnel and Hudson Park, with its natural bridge, are special features of interest. The city contains a public library and a state normal school. It has many fine churches, good municipal buildings and a city hospital. There is good water power, and the principal manufactures are cotton, woolen and print goods, boots and shoes, cigars, creamery products and machinery. It was settled in 1765, remained a part of Adams until 1878 and was chartered as a city in 1895. Four villages are now included within its limits. Population in 1910, 22,019.

North America, the northern division of the American continent and the third largest grand division of the world, extends from 9° to 70° 36' north latitude and from 47° 30' to 168° west longitude. Its length from north to south is about 4500 mi., and its greatest breadth from east to west is a little over 3000 mi. The area is 8,300,000 sq. mi. The coast line is quite irregular. The chief projections on the north are Point Barrow, Boothia and Melville peninsulas; on the northeast, Labrador; on the east, Nova Scotia, Florida and Yucatan, and on the west, Lower California and Alaska. The northern and eastern coasts have a number of prominent indentations; on the north is Hudson Bay; on the east, the Gulf of Saint Lawrence, the Bay of Fundy, Delaware Bay, Chesapeake Bay, the Gulf of Mexico and the Gulf of Hon-

duras. On the west, the Gulf of California, San Francisco Bay and Puget Sound are the only indentations of importance. However, all coasts have innumerable smaller indentations, many of which serve as fine harbors. There are numerous islands near the continent and geographically belonging to it. The most noted of these are Greenland, on the north; Newfoundland, the Bermudas, the Bahamas and the West Indies, on the east, and the Queen Charlotte and Aleutian Islands, on the west. Besides these, there are innumerable islands in the Arctic Ocean. They are, however, frozen wastes and of little importance.

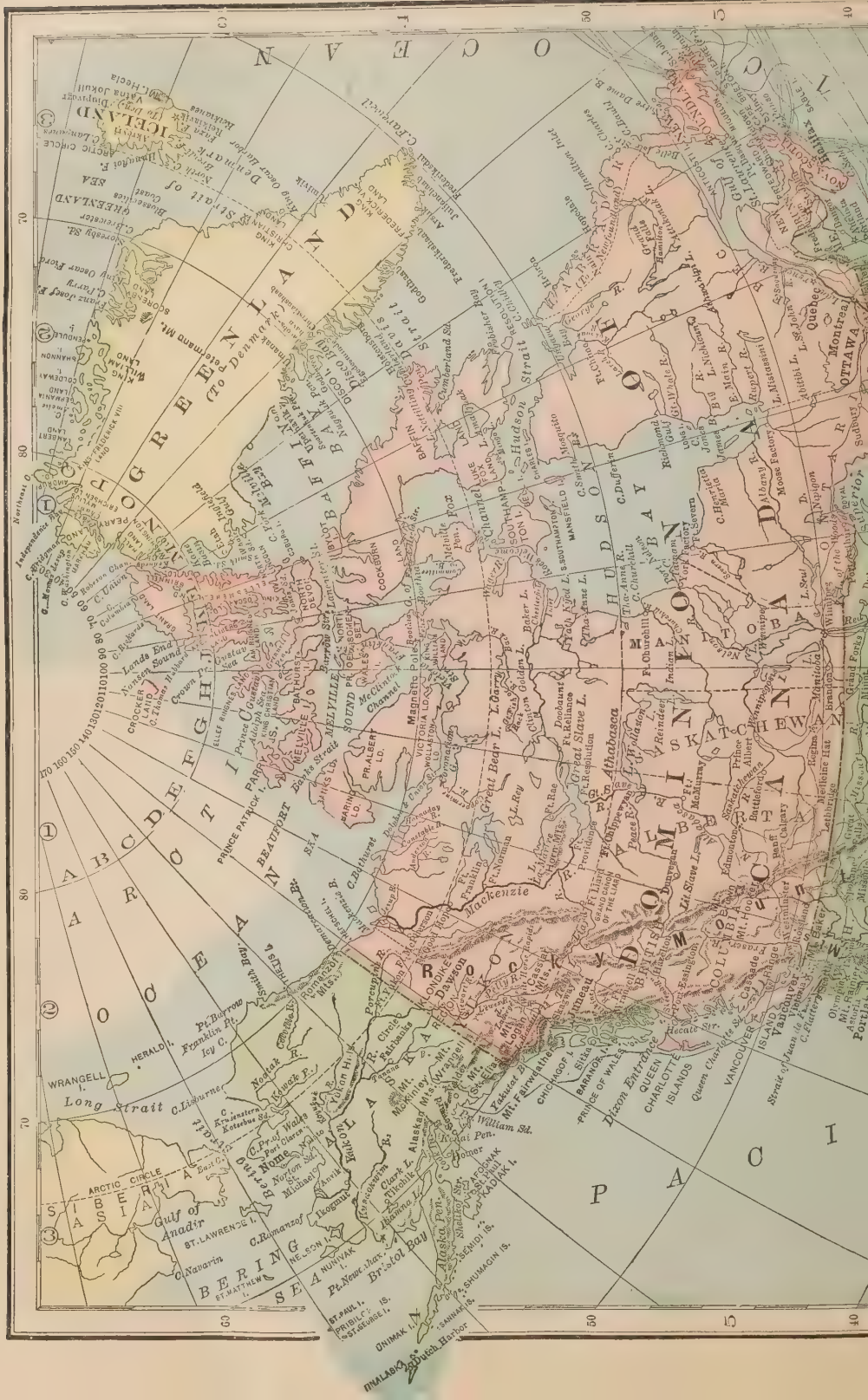
SURFACE AND DRAINAGE. North America is divided into three great physiographic regions. These are the Appalachian highland on the east, the Rocky Mountain highland on the west, and the great central plain occupying the vast interior of the continent and extending from the Arctic Ocean to the Gulf of Mexico. The Appalachian highland consists of a low plateau containing several ranges of mountains, which under different names extend from the Gulf of Saint Lawrence in a southwesterly direction to within about 300 miles of the Gulf of Mexico. The elevations in these mountains do not exceed 6700 feet, the height of Mount Mitchell, near the southern extremity of the range. Mount Washington, in the White Mountains, is nearly as high. The eastern slope of these highlands is somewhat abrupt and terminates in the Atlantic plain, which varies in width from 50 miles, in the north, to about 300 miles, in the south. The portion of this plain bordering on the ocean is low, but it is bordered inland by the Piedmont region, which is higher and consists of rolling land terminating in the foothills of the mountains (See **PIEDMONT REGION**; **APPALACHIAN MOUNTAINS**). The western slope of the Appalachians is rolling and gradual and terminates in the prairie region of the great central plain.

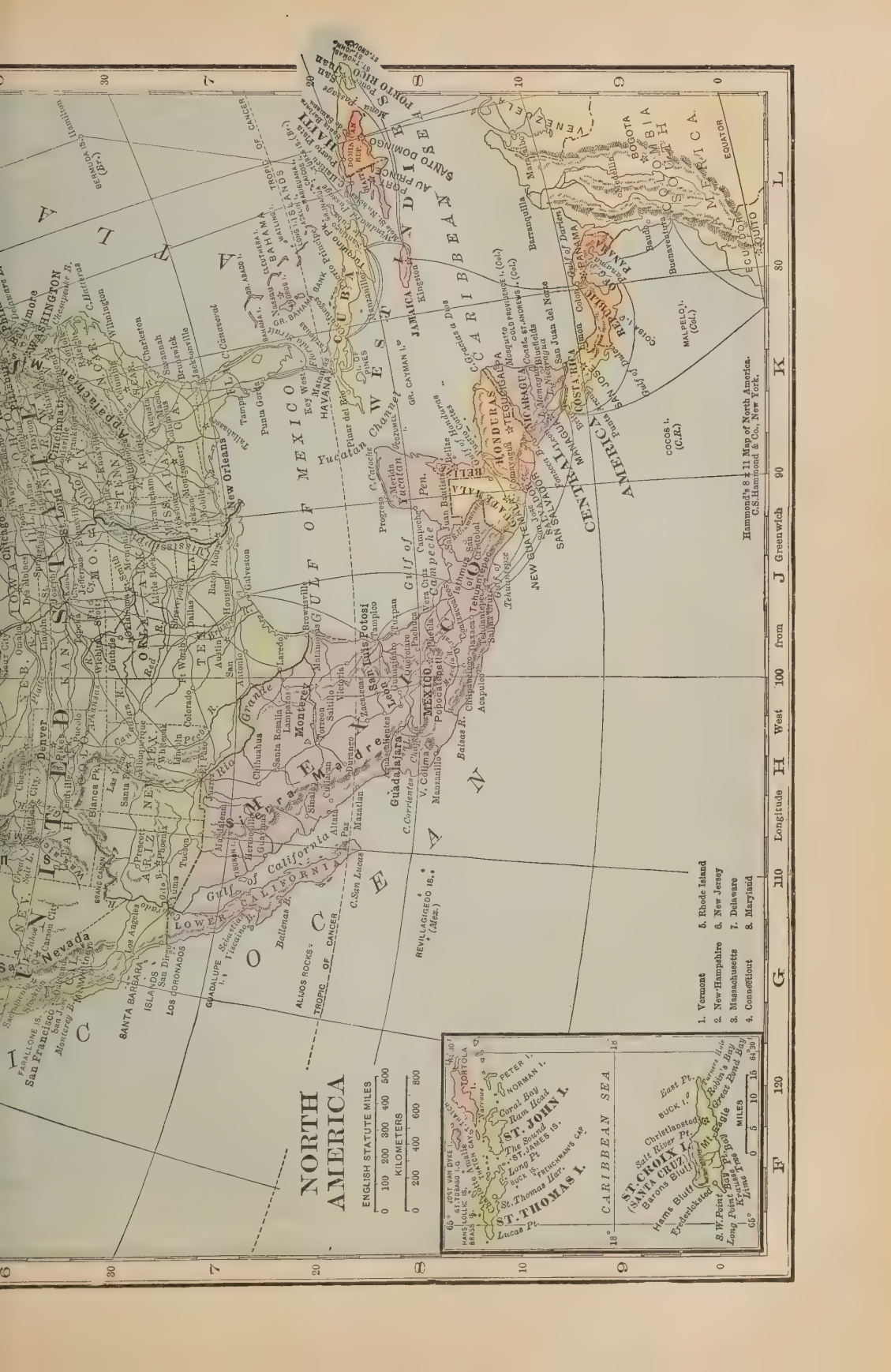
The Rocky Mountain region extends from Alaska to the Isthmus of Panama, from which point it continues as the Andean system in South America. The name *Cordilleras* is frequently given to this entire mountain system, extending through both of the American continents. The Rocky Mountain highland region consists of a plateau, varying from 3000 to 10,000 feet in altitude and from a width of a few miles, near its southern extremity, to a breadth of over 1000 miles, in Utah and Colorado. Upon this plateau are the various ranges of mountains which make up the Rocky Mountain system. Chief among

these are the Rocky Mountains proper, bordering the plateau on the east; the Cascades and Sierra Nevadas, bordering it on the west, and the Sierra Madre, which extend through Mexico. To these might also be added the Coast Ranges, in the United States. The highest elevation of these mountain ranges is found in Mount McKinley in Alaska, the highest point in North America, which has an elevation of 20,464 feet. Other important peaks in this vicinity and nearer the coast are Mount Fairweather, Mount Saint Elias and Mount Logan, each exceeding 18,000 feet in altitude. The system reaches its greatest development where the plateau is widest, in the United States, and bordering this plateau are numerous peaks exceeding 14,000 feet in height. Among the best known of these are Mount Whitney, 14,898 feet; Mount Shasta, 14,380 feet; Pike's Peak, 14,108 feet; Long's Peak, 14,271 feet; Mount of the Holy Cross, 14,006 feet. In Mexico the plateau rises to an altitude of about 7000 feet and is surmounted by a number of lofty peaks, the most noted being Popocatepetl, 17,520, and Orizaba, 18,250 feet. There are also a number of other peaks exceeding 13,000 feet. In the central part of this highland, where the plateau is widest, the mountains enclose a large area known as the Great Basin, whose waters find no outlet to the sea and which contains a number of salt lakes, of which Great Salt Lake is the largest. See **ROCKY MOUNTAINS**; **SIERRA NEVADAS**.

The Great Central Plain is divided by the Height of Land, which extends from Cape Charles in an irregular line north of the Great Lakes to the Rocky Mountains and separates the rivers flowing into the Arctic Ocean from those flowing into the Atlantic and the Gulf of Mexico. This Height of Land is a low ridge which originates in the Laurentian Plateau, but it is not marked by any distinct ranges of hills or peaks. To the north of it the land slopes gradually to the north and northeast and is generally low and quite level, in the extreme northern portion being swampy and forming a tundra similar to that in Siberia. The plain to the south is divided by the Mississippi River into two unequal regions, the eastern, well watered and consisting largely of low and level prairie, and the western, which is broad, comparatively arid and rising from the Mississippi gradually to the foothills of the Rocky Mountain plateau.

The river systems of North America consist of the Arctic system, the Atlantic system, the Gulf system, the Pacific system and the inland

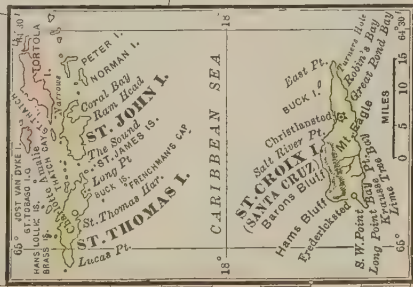




NORTH AMERICA

ENGLISH STATUTE MILES
0 100 200 300 400 500
KILOMETERS
0 100 200 300 400 500

1. Vermont
2. New Hampshire
3. Massachusetts
4. Connecticut
5. Rhode Island
6. New Jersey
7. Delaware
8. Maryland



Hammond's 8 1/2 11 Map of North America.
C.S. Hammond & Co., New York.



RELIEF MAP OF NORTH AMERICA

system, draining the great basin. In a detailed description each of these is susceptible of several divisions. The chief streams in the Arctic system are the Mackenzie, the Saskatchewan and the Nelson, while in the Atlantic system the Saint Lawrence, draining the region of the Great Lakes, occupies first place. Other streams worthy of mention are the Hudson, the Delaware and the Potomac. The Gulf system includes the Mississippi, with all of its tributaries, draining the greater part of that portion of the United States lying between the Appalachian and Rocky Mountain highlands. To this must be added the Rio Grande del Norte, which drains a portion of the plateau west of the Rocky Mountains. The Colorado, flowing into the Gulf of California, occupies a position peculiar to itself and drains the southern portion of the Rocky Mountain plateau. Of the streams flowing directly into the Pacific, the Columbia and the Frazer are the most important, while in the northwest the Yukon, flowing into Bering Sea, is one of the largest and most important rivers in the Arctic regions.

North America contains a larger number of lakes than any other continent. Aside from the Great Lakes, which have an area of more than 90,000 square miles, there are, in the north, Great Bear Lake, Great Slave Lake and Athabasca Lake, each of which is an inland sea; also, Lake Winnipeg, Lake of the Woods and Rainy Lake. In the regions of both the Appalachian and Rocky Mountain highlands are found hundreds of small lakes, some of which have been formed by glacial action, while others occupy the craters of extinct volcanoes. For a more detailed description of surface and drainage see the subhead *Surface and Drainage* in the articles describing each political division of the continent.

MINERAL RESOURCES. The eastern half of North America is much the older, and the Laurentian Plateau and the Height of Land constitute the oldest land known. The rocks here are coarse, and their surface has been worn and rounded so that no high elevations are found. South of the Saint Lawrence River and the Great Lakes, these highlands contain valuable deposits of coal and iron, which have been extensively mined in Nova Scotia, Pennsylvania, New York and regions farther south. The coal measures also extend westward into the prairie region, where large areas are found between the Ohio and Mississippi rivers and smaller areas south of the Ohio. In the western part of this plain, and also in certain sections in the Rocky

Mountain plateau, are extensive deposits of lignite coal. The Rocky Mountain highland is rich in gold, silver, copper, lead and other minerals, and previous to the discovery of gold in Australia and South Africa, this was the most productive gold region in the world. Large deposits of copper and iron are also found in the vicinity of Lake Superior. Granite, marble, slate and other building stone, as well as clay suitable for brick, tile and pottery, are very generally distributed over the continent.

CLIMATE. North America contains all varieties of climate, from tropical to frigid. The regions bordering upon the Arctic Ocean are so cold that the ground remains frozen throughout the year, but during the short, hot summer it thaws sufficiently on the surface to enable the vegetation of the region to blossom and bear fruit. To the south of this, the climate varies widely between the eastern and western coasts. Owing to the warm winds of the Pacific and the cold winds of the Atlantic, regions having the same latitude on these opposite coasts differ as to their mean annual temperature and amount of moisture. This is well illustrated by the climate of British Columbia and Labrador, the former having a comparatively mild climate, while the latter has winters so severe that it is scarcely inhabitable. In general, places along the Pacific coast have a more equable climate than those along the Atlantic. The great plain in the interior is subject to sudden changes and extremes of heat and cold, because the position of the mountain ranges is such as to allow north and south winds to sweep over it alternately. The rainfall along the Pacific coast is quite heavy, but the high mountains rob the air currents of most of their moisture, so that the region east of the Cascade and Sierra Nevada mountains is arid. The southern part of the central plain receives its moisture largely from the Gulf of Mexico and is well watered, with the exception of its western border, which is too far from the Gulf to receive the benefit of winds from that direction and is so situated in reference to the Rocky Mountains that the westerly winds are deprived of their moisture before reaching it. Thus, an arid region is constituted, which, however, has sufficient moisture to maintain grass and some other species of vegetation. The Atlantic coast is, in general, well watered. The northern portion of this plain is characterized by deep snows during the winter.

VEGETATION. In the extreme north, the vegetation consists of reindeer moss and those flower-



Shingle Oak



Yucca



Yellow Locust
and Flower



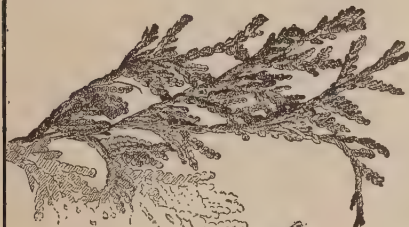
Wheat



Elm



Corn



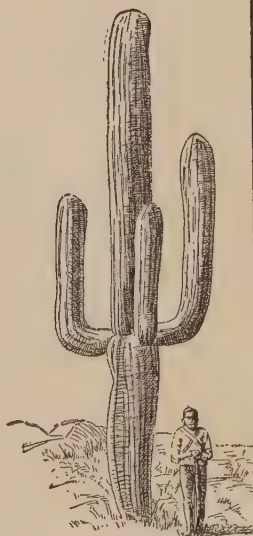
Arbor Vitae



Balsam Fir



Leaf Cactus



Giant Cactus

ing plants which mature during the few weeks of the Arctic summer. The southern border of this region is marked by willows and other shrubs. A little southward, forests of cone-bearing trees, spruce, fir, hemlock and pine, are found. These forests extend across the continent from the region south of Hudson Bay to the Pacific coast, thence southward along the Cascade and Sierra Nevada mountains nearly to San Francisco. In the eastern highland, forests of hard wood and pine are found generally distributed as far south as the Gulf and along the Gulf as far west as northeastern Texas and Arkansas. In the south, these forests consist largely of pine and cypress. The northern part of this forest region extends westward as far as the Mississippi River, and in the vicinity of the Great Lakes the extensive pine areas have given rise to a large lumber industry (See FORESTS; LUMBER). In general, the prairie region and the great plains are treeless, except along the banks of streams and around other bodies of water, but originally they were covered with a heavy growth of grass. In the southwestern part of the United States are extensive growths of cactus. For cultivated plants, see the subhead *Agriculture*, under the various articles on political divisions of the continent.

ANIMAL LIFE. When first discovered by white men, North America contained a large number of wild animals, including a wide range of species. In the extreme north all of these are still found, the most important animals of this region being the walrus, the polar bear, the fur seal and the caribou, or American reindeer. The Arctic fox, the beaver, the otter, the marten and other fur-bearing animals are also found in this region. In the southern belt of this region, extending as far south as northern Maine, are found the moose and the deer. In the Rocky Mountain region are found the elk, the deer, the Rocky Mountain sheep and, among carnivorous animals, the wolf, the coati and the black, brown and grizzly bears. Large herds of bison formerly roamed over the central plain, but these animals are now nearly extinct, and only a few herds are found in national and private parks. These plains are also the home of the gopher and the prairie dog. In the Appalachian region are found the fox, the raccoon, the opossum, the mink, the skunk, the lynx, the wild cat and the black bear, while squirrels and other small animals are found throughout the continent. There are many species of birds, ranging from the highly colored

toucans, toward the extreme south, to the wild ducks and geese of the north. The most conspicuous of the larger birds are the gull, the falcon, the vulture, the turkey buzzard, the owl, the wild turkey, the crane, the heron, the flamingo, the swan, the wild goose, the duck and the pelican. Among the smaller birds larks, orioles, thrushes, robins, bluebirds, parrots, swallows, blackbirds and grosbeaks are the most familiar. The reptiles are not conspicuous, most of the snakes being harmless. The only venomous species are the rattlesnake, the copperhead and certain varieties of watersnake. The alligator found in the lagoons around the Gulf of Mexico is the largest reptile on the continent. There are thousands of species of insects, including flies, moths, butterflies, bees and beetles. Some of these are noted for their gorgeous hues, but many of them are conspicuous only for their destruction of vegetation.

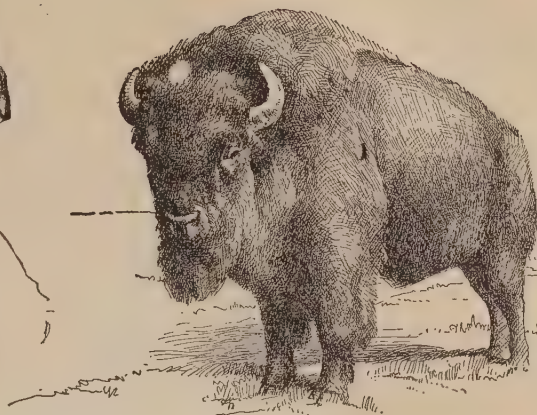
INHABITANTS. When North America was discovered it was inhabited by a copper-colored race, to whom the name *indians* was given. While this race has become nearly extinct, as civilization on the continent has progressed, remnants of it are still found from the extreme north to the south (See INDIANS, AMERICAN, *color plate*; AZTEC). Among the present inhabitants of North America are found representatives of every European nationality, a large number of people of African descent and a number of Mongolians. In general, in Mexico and Central America people of Spanish descent predominate. The United States contains representatives of every European nation, but those of English descent far outnumber any other. The colored inhabitants of the continent are confined chiefly to the Southern states of the United States, and in the Canadian provinces are found people of English and Scotch descent, while the Province of Quebec is peopled almost entirely by the descendants of the early French colonists.

POLITICAL DIVISIONS. The independent countries of North America, including islands, are the United States, Mexico, Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, Cuba, San Domingo and Haiti. The colonial possessions are the Dominion of Canada, Newfoundland, Balize, or British Honduras, belonging to Great Britain, and the islands of Saint Pierre and Miquelon, belonging to France.

HISTORY. America was first made known to the world by Christopher Columbus in 1492. The continent of North America was first dis-



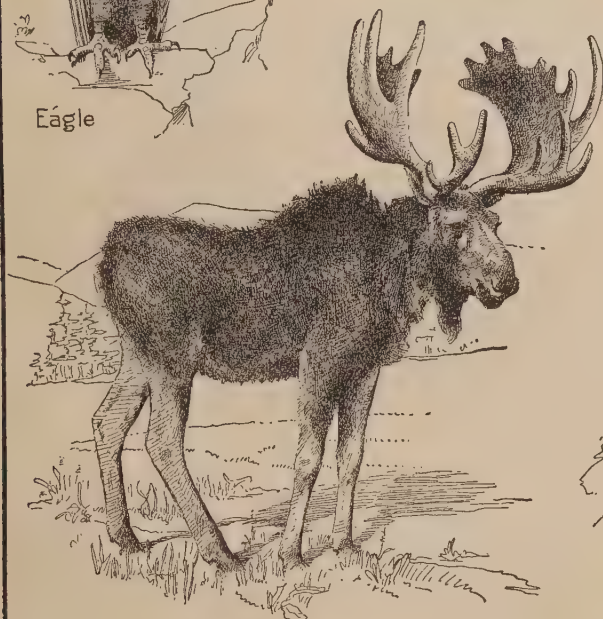
Puma



Bison



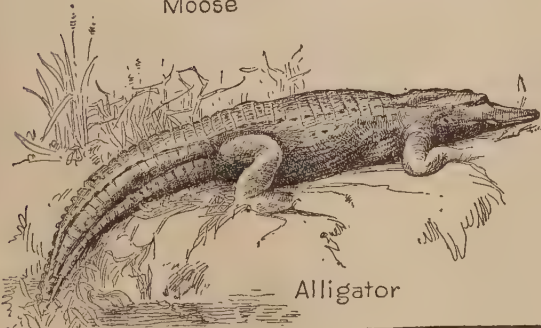
Eagle



Moose



Bear



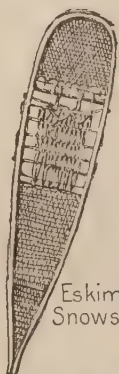
Alligator



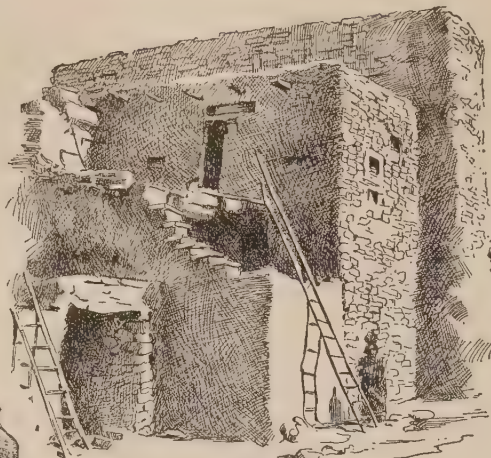
Wolf

ANIMALS OF NORTH AMERICA

See, also, full-page illustration *Animals of the United States*, in article UNITED STATES.



Eskimo
Snowshoe



Pueblo, Southwestern United States
and Mexico



Tomahawk
and Arrow



Zuni Woman,
New Mexico



Handiwork



A North American Indian
Chief



An Early Day Indian Camp

Northampton

covered by John Cabot in 1497, and the New World was named after Americus Vespuccius, who was the first to write a description of it. During the sixteenth century many voyages of discovery were made by the Spanish, Portuguese, English and French. The Spaniards colonized Mexico and made attempts to settle in what is now the southern part of the United States. The French also made attempts to settle on the coast of the United States and along the Saint Lawrence, but no permanent settlements were established in these regions until the beginning of the seventeenth century, when the English settled in Jamestown, Va., in 1607, and at Plymouth, Mass., in 1620. The French made their first settlement at Quebec in 1608. During the century following, the continent was practically divided among Spain, Great Britain and France, but in 1763, at the close of the French and Indian wars, France ceded her claim to Great Britain, and the continent was divided between Great Britain and Spain. After the American colonies established their independence, by purchase and conquest, the United States obtained possession of the Spanish territory north of Mexico. For detailed history, see subhead *History*, under CANADA, MEXICO and UNITED STATES.

Northamp'ton, the capital of Northamptonshire, England, a market town and Parliamentary borough. It is situated on the Nen, 67 mi. n. w. of London. The most interesting buildings are the Church of Saint Peter, the Church of Saint Sepulchre, the townhall and the corn exchange. The staple manufacture is boots and shoes for home and export trade; the currying of leather is also an extensive industry, and there are iron and brass foundries, breweries and flour mills. Population in 1911, 90,064.

Northampton, Mass., the county-seat of Hampshire co., 17 m. n. of Springfield, on the Connecticut River and on the Boston & Maine and the New York, New Haven & Hartford railroads. Smith College for women is located here. The city has a number of public institutions, including the Clarke Institute for Deaf Mutes, a hospital, Smith Charities, a state insane asylum, a home for aged women, Burnham Classical School for girls, Academy of Music and the public, Forbes and Lilly libraries. There is also here a unique and interesting work of home culture clubs, planned and inaugurated by George W. Cable, for the improvement of the people, using three large buildings for social meetings and educational classes. Other promi-

North Carolina

nent structures are the Academy of Music, the courthouse and the high school building. The city is located on elevated ground, amid beautiful scenery, near Mount Tom and Mount Holyoke. Both of these peaks are ascended by railways and afford magnificent views. The principal manufactures are silk, cutlery, brushes, lumber products, hardware, furniture, hosiery and various other articles. The place was settled by a small company from Springfield in 1654 and was chartered as a city in 1883. Jonathan Edwards was a minister here from 1727 to 1750. Population in 1910, 19,431.

Northampton, Pa., a city of Northampton co., on the Central Railroad of New Jersey, 13 mi. n. w. of Easton. The manufactures include flour, cement, malt liquors and a number of other products. The place has developed rapidly since 1900. Population in 1910, 8,729.

North Attleboro, Mass., a town in Bristol co., 32 mi. s. w. of Boston, on the New York, New Haven & Hartford railroad. It contains manufactures of jewelry, cotton yarn, silverware, rope and other articles. The town has the Richards Library, a G. A. R. hall and Holmes Memorial Building. It was settled in 1637 and was incorporated in 1887. Population in 1910, 9,562.

North Brad'dock, Pa., a borough in Allegheny co., about 10 mi. e. of Pittsburg, on the Pennsylvania railroad. It is a residence place and contains a large plant for the manufacture of steel rails. The borough was incorporated in 1897. Population in 1910, 11,824.

Northbridge, Mass., a town in Worcester co., 10 mi. s. e. of Worcester, on the Mumford and the Blackstone rivers and on the New York, New Haven & Hartford railroad. There are large cotton and woolen mills, machine shops and furniture, cigar and other factories. It was settled in 1662, but remained a part of Mendon until its incorporation in 1772. Population in 1910, 8,807.

North Cape, a promontory forming, with Knivskjoerodde, the northernmost point of Europe. It is on the north coast of the island of Magero, off the coast of Norway, in latitude 71° 11' north.

North Caroli'na, the OLD NORTH STATE, a state of the South Atlantic group, bounded on the n. by Virginia, on the e. by the Atlantic Ocean, on the s. by South Carolina and Georgia and on the w. by Tennessee. The extreme length of the state from east to west is 503 mi.; the average breadth, 100 mi.; the extreme

breadth, 187½ mi., and the area 52,426 sq. mi., of which 3686 sq. mi. are water. Population in 1910, 2,206,287.

SURFACE AND DRAINAGE. The state is naturally divided into three regions—the low coastal plain, the Piedmont plateau and the highlands. The first extends inland from 120 to 160 miles and has a surface ranging from sea level to less than 500 feet in altitude; the eastern portion of this consists in many places of lagoons and swamps, of which Pamlico and Albemarle sounds are the most prominent. These shallow indentations are enclosed from the sea by a low bar, which extends along the entire coast, and the chief projections on this bar constitute capes Hatteras and Lookout. The coastal plain has its western border at the Fall Line and is succeeded by the Piedmont plain, or plateau, which occupies a region extending westward until it meets the foothills of the Appalachian mountain system (See **PIEDMONT REGION**). The Piedmont region varies in altitude from 200 to 1200 feet. The surface is rugged and hilly in the western part, but quite level or undulating in the eastern. This region is separated from the western plateau of the state by the Blue Ridge Mountains. The Great Smoky Mountains form the boundary between North Carolina and Tennessee. This part of the state ranges in elevation from 1000 to 6000 feet. Mount Mitchell, with an altitude of 6711 feet, is the highest point east of the Rocky Mountains. There are a number of other peaks in the vicinity that have altitudes of 6000 feet or more. The region is quite heavily timbered, the valleys between the mountains are threaded by numerous streams, and because of its scenery and salubrious climate this part of the state is a favorite resort, both summer and winter. Numerous waterfalls are objects of interest to tourists.

The part of the state west of the Blue Ridge is drained into the Mississippi through the Hiwassee, the Little Tennessee, the French Broad, the Watauga, and the New rivers, the largest of which are the Little Tennessee and the French Broad. East of the Blue Ridge the rivers flow directly into the Atlantic or southward into South Carolina and thence to the ocean. Beginning with the west, the important streams, in their order, are the Catawba and the Yadkin, which flow into South Carolina; the Cape Fear, the Neuse, the Tar, the Roanoke and the Chowan, which flow into the Atlantic. The Tar and the Neuse find outlets through Pamlico Sound, and the Roanoke and the

Chowan flow into Albemarle Sound. There are no lakes of importance.

CLIMATE. North Carolina lies on the same parallel of latitude as the central Mediterranean basin, but its climate is modified by the proximity of the ocean on the east and the great mountain system on the west. The mean temperature for the state is 59° F. January is the coldest month of the year, but the thermometer rarely registers as low as zero. July is the warmest month, but the temperature is rarely higher than 91°. The rainfall is uniformly distributed throughout the year, the average precipitation being 52 inches. The average snowfall is 5 inches, but snow seldom remains on the ground more than a day or two, except in the mountain section. The storms on the Atlantic coast, especially off Hatteras, are violent and often destructive to shipping.

MINERAL RESOURCES. Valuable deposits of marl are found in the eastern part of the state. In the central and western sections are found iron, gold, copper, coal, mica and corundum. The deposits of iron are quite generally distributed and the magnite iron ore found in the state is not excelled by any other similar deposits in the world. Mica of excellent quality is found in Mitchell County, and North Carolina is the leading state in the production of this stone. Varieties of marble of excellent quality are found in some localities, and a choice variety of granite nearly as white as marble is quarried at Dunn's Mountain. More corundum is produced in the state than in any other region in the world. Clay and clay products yield the largest revenue of any of the mineral industries. Next to this is the production of stone. The production of monazite and zircon is also important. Considerable coal is mined, and talc, soapstone, lime, mineral water and brick are also produced in paying quantities. Some of the oldest gold mines in the country are in North Carolina, and before the discovery of gold in California, these mines were considered of great importance. However, they are now comparatively unimportant, though in some localities gold mining is still carried on. Certain localities yield precious stones, such as hiddenite, rubies, opals and agates. In the Museum of the State Agricultural Department at Raleigh is a fine exhibition of these minerals.

FISHERIES. The coast waters abound in fish, and the fisheries give employment to about 12,000 men. In some localities along the coast are extensive oyster beds, while the inhabitants of other regions are engaged chiefly in taking

North Carolina

shad and herring, the latter being obtained in large numbers. Diamond-back terrapins and turtles are captured along the coast and exported.

AGRICULTURE. A considerable proportion of the coastal plain is sandy and unproductive, but other parts of it are given to the raising of cotton, as is the southern half of the Piedmont region. Tobacco is extensively grown, and in its production the state is next to Virginia. Among the cereals, corn has the first rank. Some rice is grown on the lowlands, and in certain localities large quantities of vegetables are raised for the northern markets. Grapes and other fruits are cultivated in the upland regions.

MANUFACTURES. The rivers of Piedmont North Carolina furnish an abundance of water power, and the mountain streams give numerous sites for possible mills. Since 1890 manufacturing interests have been rapidly developed. The most important of these is the manufacture of cotton goods, which is widely distributed over the state, factories being located in every section. The state does not produce a sufficient quantity of cotton to supply these mills. The second industry in importance is the manufacture of lumber and timber products. Large areas in the state are covered with hard wood and with long-leaf and white pines. These give opportunity for lumbering and also for transforming the lumber into finishings for interiors, furniture, casings and various other articles. The manufacture of rosin and turpentine is also an important industry. Following the lumber and timber industry in importance is the manufacture of tobacco. This is followed by the making of cottonseed oil and cake, and this, by the manufacture of flour and grist mill products. Other industries of importance are the tanning and curing of leather and the manufacture of fertilizers.

TRANSPORTATION AND COMMERCE. North Carolina has three great railway systems, namely, the Atlantic Coast Line, the Southern and the Seaboard Air Line. There are also a number of individual lines and branches. The total mileage exceeds 5000 miles. The customs districts are Albemarle, Wilmington, Pamlico and Beaufort, and the chief exports are tar, turpentine, rosin, lumber, cotton, tobacco, flour and fish. Wilmington has the best harbor, is the commercial metropolis and has steamship lines to New York, Philadelphia and Baltimore. The Dismal Swamp Canal affords communication between Albemarle Sound and Norfolk, on Chesapeake Bay.

North Carolina

GOVERNMENT. The legislature consists of 50 senators and 120 representatives, all elected for two years. The legislature meets biennially, and the session is limited to sixty days. The executive department consists of a governor, a lieutenant governor, a secretary of state, an auditor, a treasurer, a superintendent of public instruction and an attorney-general, each elected for four years. These officers constitute a council of state, which acts in an advisory relation with the governor. The courts consist of a supreme court, comprising a chief justice and four associates, and a superior court, consisting of twelve judges, one for each judicial district. A superior court is required to hold sessions in each county at least twice a year. Local courts are established in towns and cities by the legislature, according to the needs of the different localities.

EDUCATION. Previous to the Civil War, North Carolina held an advanced position among the Southern states in educational matters, but after the war she was confronted with the problem of providing for a large school population, with her resources nearly destroyed. However, the school fund has gradually increased, and as fast as the resources of the state have admitted, the educational system has been extended and the length of term of the public schools increased. Separate schools are provided for white and colored children. In the larger towns the schools are well graded. The University of North Carolina is at Chapel Hill, the College of Agriculture and Mechanic Arts is at Raleigh. The state normal and industrial college for white women is located at Greensboro. The state has established an agricultural and mechanical college at Greensboro and several normal schools for the colored race. Besides these institutions, there are numerous colleges and secondary schools, supported by various religious denominations and by private enterprise. Among these are Davidson College at Davidson, Trinity College at Durham, Guilford College at Guilford, Wake Forest College at Wake Forest and Red Springs Seminary at Red Springs. Among schools especially designed for colored students are Shaw University at Raleigh, Livingston College at Salisbury and Biddle University at Charlotte.

INSTITUTIONS. A school for the deaf, dumb and blind is located at Raleigh, and one for deaf and dumb white children at Morgantown. There is a Confederate soldiers' home at Raleigh and an orphans' asylum for whites at

North Carolina

Oxford. The hospitals for the insane for whites are at Raleigh and Morgantown, and there is one at Goldsboro for colored patients. The state penitentiary is at Raleigh.

CITIES. The chief towns are Raleigh, the capital; Wihnington, Charlotte, Greensboro, Winston Salem and Asheville, each of which is described under its title.

HISTORY. North Carolina was first explored by the Raleigh expeditions late in the sixteenth century, but it was first permanently colonized after 1630 by settlers from Virginia. In 1663 it was granted to a group of the king's favorites, whom he named lord proprietors. In 1669 they attempted to establish the so-called *Fundamental Constitutions*, the work of John Locke; but their effort was vain, owing to its cumbersome and unsuitable provisions. In 1728 the proprietors sold their rights to the Crown, and North Carolina and South Carolina, which had been previously united, were governed as separate royal provinces. North Carolina took a prominent part in the struggle against England and was among the first to advise the Declaration of Independence and to adopt an independent constitution. In the war it was the scene of many important engagements.

North Carolina long refused to ratify the Federal Constitution, but it finally added its approval in November, 1789. After the war it steadily prospered, the only serious hindrance being its relations with western settlers, who at one time set up a separate State of Franklin, which was dissolved, but which finally became the State of Tennessee. Though a slave-holding state, North Carolina constantly opposed secession until after Lincoln's first call for troops, when a popular convention passed the resolution, May 20, 1861. Thereafter it furnished double its quota of troops (120,000) and suffered the heaviest losses, both of men and of wealth, throughout the war. The reconstruction contest was fought vigorously in North Carolina, but the state was admitted to the Union in July, 1868. A new constitution was adopted in 1876, and in 1900 it was amended so as practically to exclude negroes from suffrage, by means of educational and property tests. Consult Moore's *History of North Carolina*; *North Carolina and its Resources*, and the pamphlet issued by the state geological survey.

North Carolina College of Agriculture and Mechanic Arts, an industrial college founded at Raleigh in 1889. It offers four-year courses in agriculture, civil, electrical, mechanical and

North Dakota

chemical engineering. It also offers courses in textile work, dyeing and cotton manufacturing. There are also two-year courses in most of these branches, and short courses in carpentry, machine work and other trades. The agricultural experiment station is connected with the college, and the combined institutions lead in the industrial education of the state, which is making rapid progress. The faculty numbers about 50, and there are about 600 students.

North Carolina, UNIVERSITY OF, a state university established in 1789 at Chapel Hill and opened for instruction in 1795. The present organization includes a collegiate department, schools of law, medicine, pharmacy, mining and a post-graduate department. The institution is co-educational, but only a small proportion of the students are women. There are about ninety members on the faculty, and there are over 800 students. The library numbers 70,000 volumes, and the annual income is about \$275,000.

North Dako'ta, the FLICKERTAIL STATE, one of the North Central states, bounded on the n. by Saskatchewan and Manitoba; on the e. by Minnesota, from which it is separated by the Red River of the North; on the s. by South Dakota, and on the w. by Montana. The extreme length from east to west is 360 mi., and its greatest breadth from north to south, 210 mi.; its area is 70,837 sq. mi. Population in 1910, 577,056. This increase of nearly 258,000, or 80 per cent, in ten years, shows a remarkable growth.

SURFACE AND DRAINAGE. The state belongs to the great central plain. The eastern end, which is a part of the valley of the Red River of the North, is nearly level and has an elevation of from 800 to 1000 feet. This valley expands toward the north, until it reaches a width of 60 miles, near the Canadian boundary. The western edge of the valley rises gradually into rolling prairie, which reaches its greatest elevation in the height of land extending diagonally across the state from the northwest corner, and known as the Plateau du Coteau du Missouri. This plateau divides the state into two nearly equal portions. On its south and west, the surface slopes directly, and in sections quite rapidly, to the Missouri River. That portion of the state west of the plateau is more rolling and broken, in the southeastern part becoming quite abrupt, though it contains no high peaks. The highest land is in the Turtle Mountain region, which is in the north central part of the state and extends across the Canadian boundary.

The portion of the state belonging to the

North Dakota

valley of the Red River is drained through this stream ultimately into Hudson Bay. The principal tributaries of the Red River from Dakota are the Sheyenne, which flows southerly, then northeasterly and enters the main stream north of Fargo, and the Pembina, which rises in Manitoba and enters the Red River a little south of the Canadian boundary. The greater part of the state is drained by the Missouri, although this stream receives no important tributaries from the east. The Yellowstone joins it just after both rivers cross the western boundary, and the other chief tributaries, proceeding southward, are the Little Missouri, the Heart and the Cannon Ball. A portion of the north central part of the state, between Turtle Mountains and the plateau, is drained by the Souris, or Mouse, which enters the state from the Province of Saskatchewan and, after doubling on its course, flows into Manitoba and unites with the Assiniboin. The state contains few lakes. The most important of these is Devils Lake, northeast of the center. This is a large body of brackish water, surrounded by trees and noted as a summer resort.

CLIMATE. The winters are somewhat severe, but the dryness of the atmosphere renders the sensible temperature no greater than in latitudes much farther south. The snowfall is light, but storms (blizzards) from the northwest occur several times during the season. Summer follows winter in quick succession and is characterized by warm, pleasant days and cool nights. The mean annual temperature is 39.4°. The mean annual rainfall varies in different localities. At Fargo it is 27.17 inches; at Pembina, 21.91. The eastern half of the state has sufficient rainfall for agriculture by ordinary methods, and in the western part, dry farming is successful.

MINERAL RESOURCES. Clays from which excellent brick and pottery are made abound in various localities; building stone is found in the Turtle Mountain region, and the region west of the Missouri is underlaid with extensive deposits of lignite coal of good quality. This outcrops in many places, so that farmers can mine their own coal. In other localities the mines are worked by corporations. This is the only mining industry of importance in the state. The output is about 300,000 tons annually.

AGRICULTURE. The soil in the eastern half of the state is unusually fertile and of great depth, especially in the valley of the Red River. The climate is especially suited to the raising of spring wheat, and North Dakota has long been

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known as the leading state in the production of the variety of wheat known as Number 1 Hard, which is the best for the manufacture of flour. Some years the crop in this state exceeds 100,000,000 bushels. This part of Dakota contains the largest farms under cultivation in the United States, some of them exceeding 30,000 acres. The central and western parts of the state are given to general farming and stock raising. Besides wheat, the important crops are flax, oats, barley, corn and potatoes. The rainfall in the western part of the state is scant, but this region is well adapted to grazing, and large numbers of cattle, horses and sheep are raised.

MANUFACTURES. The leading industry in this line consists of the manufacture of flour and other grist mill products. Numerous flour mills are located throughout the wheat-growing region. Considerable quantities of butter and cheese are made, and brick is manufactured in many localities. At Dickinson and Hebron, pressed brick of excellent quality is produced.

TRANSPORTATION. The Missouri River is navigable throughout its entire course in North Dakota. The Great Northern and Northern Pacific railroads cross the state from east to west. The "Soo" line crosses in a northwesterly direction, and the Pacific Coast line of the Chicago, Milwaukee & Saint Paul Railroad crosses the southwestern corner of the state. This line has some branches extending northward to Fargo and other points. The other trunk lines are also connected by numerous cross lines. In 1910 the state had over 5500 miles of railway.

GOVERNMENT. The legislature consists of a senate that cannot contain less than 30, or more than 50, members, and a house of representatives that must have not less than 60, nor more than 140, members. The senators are elected for four years, and the representatives for two years. The legislature meets once in two years, and the sessions are limited to sixty days. The executive department consists of the governor, a lieutenant governor, a secretary of state, an auditor, a treasurer, a superintendent of public instruction, a commissioner of insurance, three commissioners of railroads, an attorney-general and a commissioner of agriculture and labor, each elected for two years. The courts consist of a supreme court of five judges, elected for six years, and six district courts, presided over by a judge for each district, elected for four years. Local courts are established in counties and cities.

EDUCATION. One-eighteenth of all the lands in the state are reserved for public school pur-

poses, and these, when sold, will create a school fund of more than \$50,000,000. In addition to this appropriation, the state has made large appropriations for the state institutions. The public schools are under the supervision of a state superintendent, and the high schools under a board of education consisting of the governor, the superintendent of public instruction and the president of the state university. Of this commission, the state superintendent is the executive head. Each county has a county superintendent, responsible for the licensing of teachers and for the conduct of the schools in his county. The state university at Grand Forks is at the head of the public school system. There are state normal schools at Mayville and Valley City, an industrial normal school at Ellendale, a school of forestry at Bottineau and a scientific school at Wahpeton. The state agricultural college is located at Fargo. The Fargo College is also an important institution of collegiate grade. The public schools and state university derive a part of their support from lands set apart for this purpose.

INSTITUTIONS. The school for the blind is at Bathgate, the institute for the feeble-minded is at Grafton and the school for the deaf and dumb is at Devils Lake. There is a soldiers' home at Lisbon; the asylum for the insane is at Jamestown, the state penitentiary is at Bismarck and the state reform school is at Mandan.

CITIES. The chief cities are Bismarck, the capital; Fargo, Grand Forks, Valley City, Minot, Devils Lake, Jamestown and Mandan.

HISTORY. The territory of Dakota was named after a family of Indians and was obtained by the United States through the Louisiana Purchase, in 1803. The first real and permanent white settlement in this territory was probably established by French-Canadian settlers near Pembina in 1861. In 1812 Lord Selkirk, by mistake, built his fort south of the Canadian line. In 1851, a large portion of the territory was opened to white settlement, part being attached to Minnesota Territory and part to Nebraska Territory. Dakota Territory was organized in 1861. Yankton was the capital until 1883, when Bismarck became the seat of government. In 1889 provision was made to admit Dakota into the Union as two states, North Dakota being recognized in November. Since that time its great agricultural resources have given it exceptional prosperity.

North Dakota, UNIVERSITY OF, a state university established at Grand Forks in 1884. It

includes a collegiate department, a graduate department, a teachers' college, a college of mining engineering, and colleges of mechanical engineering, law and medicine. Instruction in business and commerce is also provided for. In addition to the regular work of the university, extension courses are maintained. Women are admitted to all departments and constitute about one-half of the enrollment. Tuition is free. The faculty numbers over ninety, and there are over 1100 students. The library contains 50,000 volumes, and the annual income, exclusive of building fund, is \$350,000.

Norther, the name given a cold north wind, which blows over Texas and the Gulf of Mexico. In winter it produces a cold wave and in summer a cool wave. These winds sometimes start as far north as the Northwest Territory in Canada and proceed southward, extending a blanket of cold air over the entire Mississippi Valley. They are usually predicted from twenty-four to thirty-six hours in advance, and warnings of their approach are given by the weather bureau.

Northern Lights. See *AURORA BOREALIS*.

North'men or Norsemen, a name applied to those bold sea rovers who, in their small, sharp-prowed, open vessels, ravaged Great Britain and other parts of northern and western Europe from the eighth to the eleventh century. They were known to the inhabitants of the British Isles as Danes and Eastmen. They also harried the eastern coasts of the Baltic and the Mediterranean shores and made permanent settlements in the Orkneys, the Hebrides and northern France, where they were called Normans. They left colonies also in the Faroe Islands and in Iceland, whence some of them went to Greenland (982). There is a story that in 1002 the Viking Leif Ericson visited the coast of New England and named it *Vinland*.

They called themselves *Vikings* and their leaders *sea-kings*. They were a vigorous race, fond of warlike adventure, and worshiped the gods Thor and Odin. The chief causes of their plundering expeditions were, no doubt, the crowded population and scarcity of food in their native homes, as well as their natural love of adventure. See graphic illustrations, *NORSE-MEN IN AMERICA*, in Volume V.

North Polar Exploration. On September 5, 1909, Commander Robert E. Peary, of the United States Navy, telegraphed from Indian Harbor, "Stars and stripes nailed to the North Pole." A later message announced that Peary reached the Pole April 6, 1909. Five days be-

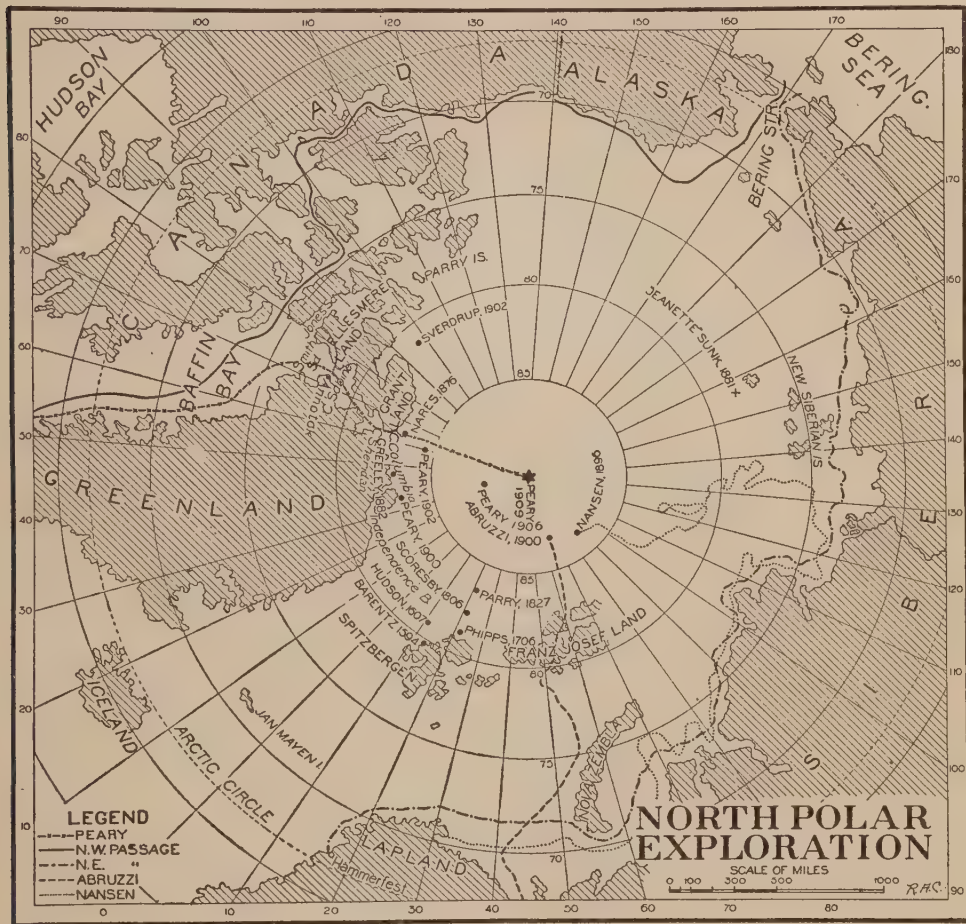
North Polar Exploration

fore Peary's message, Dr. Frederick A. Cook, of Brooklyn, announced that he had reached the Pole April 21, 1908.

PEARY'S EXPEDITION. Peary's discovery was the crowning achievement of nearly a quarter of a century spent in Arctic exploration. The expedition which resulted in his triumph left New York in the Steamer *Roosevelt* in July, 1908, and reached Etah, the most northerly

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tangency that might arise. While in winter quarters Peary hauled his supplies by sledges to Cape Columbia, from whence the "dash to the Pole" was to start. The expedition left Cape Columbia in six divisions, each a day apart, and at the start the outfit consisted of 7 white men, 19 Eskimos, 140 dogs and 23 sledges. As the march proceeded, these divisions returned to Cape Columbia from time to time



inhabited point in Greenland, on August 8. Thence the *Roosevelt* went to Cape Sheridan, where it went into winter quarters Sept. 5. The party began the dash for the Pole Feb. 15, 1909, and the destination was reached April 6.

No other expedition for Arctic exploration had been so perfectly organized and completely equipped as this. It embodied the results of Commander Peary's long experience in the Polar regions, and practically provided for every con-

until at last only one division remained. During the advance igloos, or Eskimo huts, were built at each camp. These furnished the most desirable shelter for the men, and were in readiness for the party on their return march. With the exception of the drowning of Prof. Marvin of Cornell, the entire expedition returned to the starting point without the loss of a life.

Besides reaching the Pole, the Peary expedition was able to add important data to the infor-

mation previously gained about the Arctic regions. On his advance march Commander Peary took frequent soundings, and by these showed that the ocean increased in depth soon after leaving Cape Columbia. These soundings show the Arctic Ocean about the Pole to be 12,000 or more feet in depth. This discovery tends to dispel the idea previously current that this was a shallow ocean. It also points to a strong inference that there is no large body of land near the Pole.

Peary's account of the ice shows that in the far north it is more even and less difficult to travel on than near the land. He reports no discovery of life about the Pole, neither did he see any land.

On his other expeditions to the Arctic regions Peary explored and mapped the northern coast of Greenland and made extensive explorations of the Arctic Archipelago. On his return voyage in 1897 he brought from Cape York a meteorite which is the largest of its kind that has ever been discovered. Without doubt he will always rank as the foremost Arctic explorer of his time. (See PEARY, ROBERT E.)

COOK'S EXPEDITION. Dr. Cook accompanied Mr. J. R. Bradley on a hunting expedition to northern Greenland in July, 1907. The boat on which the party sailed was not constructed for navigating the polar seas, so that Cook was obliged to winter at Annotok, a long distance south of Cape Columbia. From Dr. Cook's account it appears that during the winter he transferred his baggage to Ellesmere Land from whence he started for the Pole Feb. 19, 1908. His route was to the west of Peary's and instead of returning by the same route, his return was still further west. The return trip was greatly prolonged by meeting spaces of open water, and the dangerous conditions of the ice, so that Dr. Cook and the few Eskimos who remained with him throughout the journey were compelled to pass the winter of 1908-1909 on the south shores of Jones' Sound. For this reason he was unable to send the news of his discovery at an earlier date. Dr. Cook landed in Copenhagen Sept. 5, 1909, where he was received with high honors by the Danish government and the learned societies of the city.

THE CONTROVERSY. Dr. Cook was unknown as an Arctic explorer, neither was he known to be engaged in an expedition to the Pole. For these reasons his announcement was a great surprise to the world of science, and many geographers and learned societies withheld their

acceptance of his statement until his records could be examined by competent authority. Dr. Cook submitted his record to the University of Copenhagen. After a most careful examination his records were not found to substantiate his claims. The matter, however, was not dropped with the verdict of the University, and further investigations showed that Cook's claim had no foundation in fact. Commander Peary submitted his records to the National Geographic Society at Washington. The Society approved the records, stating that they fully substantiated Peary's claims to the discovery of the Pole.

HISTORY. Soon after the discovery of the New World, mariners believed that by sailing northward along the coast of North America a passage westward to Asia would be found, which would be much shorter than routes then used. This long-sought route has always been known as the Northwest Passage, and before the middle of the nineteenth century more than two hundred voyages had been attempted for its discovery. The English were the first explorers, beginning with John Cabot in 1497. He was followed by Sebastian Cabot, Frobisher, Davis and others, and in 1806 William Scoresby reached latitude 81° 30' north and added considerable to the previous knowledge of the coast of Greenland. Among early explorers sent out by the Dutch were Barents, who reached Nova Zembla in 1594, and Hudson, an Englishman acting for a Dutch company, who explored Hudson Bay and surrounding waters in 1609 and 1610.

During the eighteenth century whaling vessels frequented the Arctic regions, and their commanders brought back considerable knowledge of those inhospitable shores. In 1845 an expedition under Sir John Franklin was sent out to discover the Northwest Passage. The entire company perished, and for more than ten years no trace of them was found. The desire to find, and, if possible, to relieve Franklin and his followers, led to numerous expeditions conducted by England and the United States.

Among the most celebrated commanders of expeditions for the relief of the Franklin party were Doctor Kane, of the United States, who gave the first popular and systematic account of the polar regions (See KANE, ELISHA KENT), and Hayes, who accompanied Kane and afterward conducted an expedition of his own, reaching latitude 81° 35' north. He was followed by Hall, who reached latitude 82° 16' in 1871, but died on his return. In 1875 Nares reached

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a point north of Grinnell Land, in latitude $83^{\circ} 20'$.

During 1882 and 1883 several stations were established by the United States and European nations, coöperating with one another for the purpose of making a scientific study of the magnetic and climatic conditions of the region. The American station, under the command of A. W. Greely of the United States army, was located on the eastern coast of Grinnell Land and Lady Franklin Bay, $81^{\circ} 44'$ north. The station was maintained nearly two years, when the party retreated southward and was rescued in June, 1884. Only 7 of the 32 men survived.

Nordenskjöld sailed eastward from Tromsø toward Bering Strait. The next season, in 1879, he made the passage and reached Yokohama (See NORDENSKJÖLD, ADOLPH ERIC). Lieutenant De Long of the United States navy, in the *Jeannette*, entered the Arctic Ocean through Bering Strait, but his ship was crushed in the ice and sunk in 1881. De Long and his party attempted to escape by moving southward toward the New Siberian Islands. They became separated in a storm and entered the Lena delta by different passages. De Long and most of his followers perished, while the other party, under Commander Melville, survived and reached home in safety. The Norwegian, Nansen, in 1893 sailed northward from Christiania on the *Fram*, a vessel specially constructed for the voyage. In September he was shut in by the ice and began a northward drift, thus utilizing the ocean current which sweeps from Bering Strait and the vicinity of the New Siberian Islands across the pole toward Greenland. See NANSEN, FRIDTJOF.

Another American expedition noted for its elaborate equipment was the Baldwin-Ziegler expedition, which left Tromsø, Norway, in July, 1901, for Franz Josef Land. Baldwin established winter quarters on Alger Island, $80^{\circ} 24'$ north, and had stores deposited in other places, also, so that in case his party should be carried out of its course supplies could be reached.

The farthest point reached up to 1906 , $86^{\circ} 30'$, was attained by the expedition under the duke of Abruzzi, in 1900. The commander accomplishing this feat was the Italian Cagni, of the Abruzzi party. The Northwest Passage by ship was traversed in 1905 by Captain Roald Amundsen in the sloop *Gjøa*, a small ship of 47 tons, propelled by a gasoline engine. Amundsen entered the Arctic Ocean through Davis Strait, went westward across Lancaster Sound, then southward and followed the coast to Bering Strait.

North Sea

A few attempts to reach the pole by navigation of the air have been made. Andre, a Swedish engineer, embarked from Spitzbergen in an ordinary balloon in 1897. Nothing was ever heard from him. Walter Wellman of the *Chicago Record-Herald* made several unsuccessful attempts to reach the pole in a dirigible balloon (See FLYING MACHINE), the last in 1909.

North'rop, CYRUS (1834-), an American educator. He was born at Ridgefield, Conn., and was educated at Yale. In 1861 he became clerk of the Connecticut house of representatives



CYRUS NORTHROP

and two years later of the senate. After this he was made professor of rhetoric and English literature at Yale and held this position until 1884, when he was elected president of the University of Minnesota, which position he filled for 27 years with great credit.

North Sea or German Ocean, a large branch of the Atlantic Ocean, lying between Great Britain and the continent of Europe, with Great Britain and the Orkney and Shetland islands on the west; Denmark and part of Norway on the east; the Strait of Dover and part of France, Belgium, Holland and Germany on the south, and the North Atlantic on the north. Its extreme length is 680 miles; its greatest breadth, 412 miles, and its area, about 200,000 square miles. The North Sea is deepest on the Norwegian side, where the depth is

sometimes as great as 1000 feet. The average depth of the southern part is about 100 feet; of the northern part, 400 feet. The fisheries, especially of herring, cod, ling, haddock and flatfish, are exceedingly valuable. The rise and fall of the tide is very great at certain places. Navigation, on account of sand banks, is dangerous.

North Sea Canal (called in Holland the Amsterdam Canal), a great ship canal that connects Amsterdam with the North Sea, running east and west across the narrow neck of land that unites North Holland to the rest of the kingdom.

North Star, the north polar star, the star *α* of the constellation Ursa Minor. It is close to the true pole, never sets, and is therefore of great importance to navigators in the northern hemisphere. See **POLE STAR**.

North Tonawanda, *ton'a won'da*, N. Y., a city in Niagara co., 10 mi. n. of Buffalo, on the Niagara River, the Tonawanda Creek opposite Tonawanda, the Erie Canal and on the New York Central, the Erie, the Lehigh Valley and several other railroads. It is in an agricultural region and contains lumber yards and extensive manufactures of various lumber products, steam pumps, merry-go-rounds, pig iron, bolts, nuts and pipe. The city has a public library. Population in 1910, 11,955.

Northwestern University, an institution of higher learning at Evanston and Chicago, Ill., founded in 1851, under the auspices of the Methodist Episcopal Church. It comprises a college of liberal arts and a school of music and oratory at Evanston, and schools of law, medicine, pharmacy and dentistry in Chicago. Three schools of preparatory instruction are maintained by the university, the academy in Evanston, the Grand Prairie Seminary at Onarga and the Elgin Academy at Elgin, Ill. The Garrett Biblical Institute, the Norwegian-Danish Theological School and the Swedish Theological Seminary, all at Evanston, also maintain close relations with the university. The faculty numbers about 525 and the enrollment in all departments exceeds 4500. The library contains about 174,000 volumes.

Northwest Passage, the route from the Atlantic to the Pacific, via the Arctic Ocean, to the north of British America. That such a passage existed, was long known from the records of the ill-fated expedition of Sir John Franklin (1847), and Captain Robert McClure (1852); but it seems impossible that it should ever be of value to man, though the numerous expeditions in

search of it resulted in geographical and scientific knowledge which the science of the future may, in some way, utilize. In 1905, Amundsen succeeded in passing through Bering Strait into the Pacific. See **NORTH POLAR EXPLORATION**.

Northwest Territory, a name formerly given to that portion of the territory of the United States roughly included between the Great Lakes, the Ohio River and the Mississippi River, including the present states of Ohio, Indiana, Illinois, Michigan, Wisconsin and part of Minnesota. The larger part of this territory was claimed by Virginia, New York, Massachusetts and Connecticut, by reason of their charters and other grants. These claims long stood in the way of the adoption of the Articles of Confederation, since Maryland insisted that the territory should become a part of the United States before a new government was organized. Congress, therefore, promised in 1780 that the territory, when ceded to the United States, should be formed into new states on an equal footing with all the others, and the various states ceded their claims, Connecticut being the last, in 1786. Each, however, retained a small portion for its own special purposes. In March, 1784, a temporary government was established. This was superseded by the Ordinance of 1787. See **ORDINANCE OF 1787**.

North Yakima, *yak'he ma*, WASH., the county-seat and chief city of Yakima co., is situated on the Yakima River & Northern Pacific Railroad, about 200 mi. s. w. of Spokane. It is a distributing center for a large surrounding territory. It has extensive fruit canneries, flour mills, saw-mills, other wood-working factories and warehouses. The city has paved streets, numerous churches and an excellent system of public schools. The State Fair holds its annual exhibition here. Population in 1910, 14,082.

Norton, CHARLES ELIOT (1827-1908), an American author and art critic, born at Cambridge, Mass., and educated at Harvard University. On completing his education he became connected with a mercantile house in Boston and soon after made a business trip to India and Europe. This ended his business career, and he devoted the remainder of his life to literature and art. From 1864 to 1868 he was, with James Russell Lowell, editor of the *North American Review*, and in 1875 he was appointed professor of the history of art in Harvard University and was made professor emeritus in 1900. Mr. Norton was one of the foremost representa-

tives in America of higher culture, and he wrote and spoke frequently upon his favorite themes of literature and art. He also edited the letters of a number of our prominent literary men, including those of Emerson, Lowell and George William Curtis, also of the English authors Carlyle and Ruskin. Among his published works are *The New Life of Dante*, *The Divine Comedy of Dante* and *Notes of Travel and Study in Italy*.

Norwalk, *nor'wawk*, CONN., a city in Fairfield co., 14 mi. s. w. of Bridgeport, on the Norwalk River, near Long Island Sound, and on the New York, New Haven & Hartford railroad. It has an attractive location and is a popular residence place and summer resort. Steamships make regular connection with New York City. There is a valuable trade, and the city has extensive oyster beds and various manufactures of wearing apparel, dress goods, locks, air compressors and other articles. The municipality has a Carnegie library, a city hospital, a county children's home and a state armory. It was settled in 1649, was incorporated two years later and was chartered as a city in 1893. Population in 1910, 6954.

Norwalk, OHIO, the county-seat of Huron co., 55 mi. w. by s. of Cleveland, on the Lake Shore & Michigan Southern and the Wheeling & Lake Erie railroads. It is in an agricultural and stock-raising district and contains iron and steel works, piano factories, railroad shops, printing works, machine shops, canneries and other factories. The place was settled in 1817 and was chartered as a city in 1881. Population in 1910, 7858.

Nor'way (Norwegian, *Norge*), a country in the north of Europe, constituting the western part of the Scandinavian peninsula. It extends from latitude 57° 57' to 71° 11' 40" north, and from longitude 4° 45' to 31° 11' east. It is bounded on the east by Russian Lapland and Sweden and on all other sides by the sea—on the north by the Arctic Ocean, on the northwest and west by the Atlantic Ocean and the North Sea and on the south by the Skagerrak. Its length is about 1050 mi.; its width, from 20 to 260 mi., and its area, 124,129 sq. mi., or a little more than that of New Mexico. The country is divided into twenty districts, of which the capital, Christiania, forms one, and the city of Bergen, another. Population in 1910, 2,391,782.

SURFACE AND DRAINAGE. The coast of Norway is characterized by its bold, precipitous cliffs, and is remarkable for the fiords which cut

into it deeply in all directions. Geologists believe that these fiords are the result of glacial action. Although the length of a line drawn about the outer belt of the rocks of the Norwegian coast would be less than 2000 miles, the total shore line of the country, including that of some of the larger islands, is about 12,000 miles. The surface of Norway is mountainous, particularly in the west and north, but the mountains are not, generally, distinct chains, but huge plateaus or tablelands, from which the peaks rise singly or in groups. The highest point in the country and in the Scandinavian peninsula is the Galdhøppigen, in the Langfjeld Plateau. Immense snow fields and great glaciers descending from the plateaus are among the most distinctive features of Norwegian scenery, and Jostedalstrå is the largest glacier of Europe.

Owing to the narrowness of the greater part of the country, the rivers of Norway are of no great importance. The few important rivers which Norway can claim as exclusively her own have a southeasterly direction and discharge into the Skagerrak. Of these the chief are the Glommen, with its tributary, the Lougen; the Drammen, and the Skien. The slope of all these rivers is steep, and this renders them unfit for navigation. The most important river in the north is the Tana, which, after forming part of the boundary between Norway and Russia, empties into the Arctic Ocean. Lofty waterfalls are numerous throughout the country, and there are many lakes, most of which, however, are small.

CLIMATE. The climate of Norway is, on the whole, severe, but not unbrokenly so, as might be expected, judging from the fact that for 300 miles the country lies within the Arctic Zone. The great extent of the sea coast and the large amount of water within the country have a noticeable effect on the climate. In the summer the days are long and bright, but the winter days are short, dark and very cold. Almost one-third of the country lies within the famous "Land of the Midnight Sun." On the western coast, where the rainfall is greatest, it amounts to from 70 to 75 inches annually, and at some points it reaches a maximum of 90 to 92 inches. On the southeast coast it is about 48 inches, while on parts of the plateau the average is only 12 inches.

MINERAL RESOURCES. The minerals of Norway are abundant, but as means of transportation are very inadequate in some parts of the

country, the mines have never been worked to their utmost. The most important metals are iron, copper, silver, cobalt, chrome and feldspar, the chief mineral product within recent years being copper. Coal is not found to any extent, although deposits have been discovered at a few points on the mainland and on some of the islands.

FISHERIES. The fisheries are of great importance. They include cod, herring, mackerel, salmon, sea trout and lobsters, the cod and herring fisheries being by far the most important. In a single year the catch of the Lofoden cod fisheries has been as high as 35,000,000.

AGRICULTURE. Only about 1000 square miles of the surface of Norway are under cultivation. Oats form the chief cereal crop. Barley ripens as far north as 70° of latitude; oats, to 68°, but wheat does not ripen beyond 64°, and that only in the most favorable seasons. None of the grains are sufficient to supply the needs of the country. Potatoes are grown with success even in the far north. The farms are generally the property of those who cultivate them and commonly include a large stretch of mountain pasture, often 40 or 50 miles from the main farm, to which the cattle are sent for several months in the summer. The rearing of cattle is an extensive and profitable industry. The horses are vigorous and sure-footed, but some of them are of diminutive size. In the north many herds of reindeer are kept, and they constitute the chief wealth of many of the inhabitants of that region. The dairy products of Norway are excellent and are exported to some extent.

MANUFACTURES. About one-fifth of the surface of Norway is covered with forest. The greatest forests are of pine, but fine forests of oak are found in the south, and birch forests grow farther north. Timber and lumber constitute about one-third of the total exports of the country. The chief of the manufacturing industries is the production of lumber and wooden ware. The other manufactures include paper making, distilling, shipbuilding and the manufacture of silk, cotton, wool and flax tissues, tobacco, machines and lucifer matches. The importations of manufactured articles are very large.

TRANSPORTATION. The Norwegians are famous as sailors, and the country possesses the largest merchant marine, in proportion to its population, in the world. A large part of the trade consists in the transportation of freight for

foreign nations. The imports of the country far exceed the exports, but the revenue from the carrying trade makes up the deficiency. There are only about 2000 miles of railway in operation in the country.

INHABITANTS AND LANGUAGE. The people of Norway are almost all of Scandinavian origin. A small number of Lapps live in the northern part. The country is the most thinly populated of Europe, and during the nineteenth century it lost a larger percentage of its population by emigration to the United States than any other country of Europe, except Ireland. The Norwegian language is practically identical with the Icelandic and the Danish language. The educated classes speak Danish, and this is also the language used in literature.

EDUCATION. Elementary education is free and compulsory, and the primary schools are supplemented by many secondary schools. There is but one university, that of Christiania, which has about 1500 students.

LITERATURE. The producers of the first literature of Norway were the *skalds*, who are known to have composed poetry as early as the ninth century. These oldest *sagas*, while they do not exist in their original form, have in some instances been incorporated in the *Snorra Edda*, and so preserved. The *Elder Edda*, probably composed between the ninth and the eleventh centuries, owed much to Norwegian composers. From the fourteenth century, the date of the union with Denmark, to 1814, the time of the separation from the latter kingdom, Norway had no national literature, its literary history being identical with that of Denmark. As was natural, the first productions after the separation were patriotic songs. The first great national poet was Henrik Wergeland (1808-1845), whose greatest poem is *The English Pilot*. Among others who flourished during the middle of the nineteenth century may be mentioned Johan Sebastian Welhaven (1807-1873), Peter Christen Asbjørnsen and Jørgen Moe. It was Asbjørnsen and Moe who brought to the notice of the world much of the native material contained in the old folk songs and popular poetry. During the last part of the nineteenth century the greatest names in Norwegian literature are those of Ibsen and Bjørnson (See IBSEN, HENRIK; BJORNSEN, BJORNSTJERNE).

GOVERNMENT AND RELIGION. The government of Norway is a constitutional monarchy. From the early nineteenth century until the twentieth century, the country was united with

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Sweden. (For the separation of the two countries, see subhead *History*, in this article.) The legislative power is vested in a parliament, or *Storting*, which is elected every three years. The *Storting* divides itself into two chambers, the *Lagthing*, consisting of one-fourth of the members, and the *Odelsting*. All bills must originate in the latter chamber. Universal suffrage exists. There are no titles of nobility under the Norwegian government.

The great body of the people are of the Lutheran religion, which is the national Church. Other sects are tolerated, although government offices are open only to members of the established Church.

CITIES. The chief cities of Norway are Christiania, the capital; Bergen, Trondhjem, Stavanger and Drammen.

HISTORY. It is not until the ninth century that the historical period in Norway begins. In 872 the numerous small kingdoms, which had been divided and ruled over by the petty chiefs, or *jarls*, were united under Harold I. During this century and that which followed Viking expeditions were common, and through intercourse with more civilized parts of Europe, Norway received Christianity. The country reached its height as an independent power under Haakon the Old (1217-1263), and it was during this century, too, that permanent colonies in Iceland and Greenland were founded by Norse adventurers. The grandson of Haakon the Old, who died in 1319, was the last Norwegian king of Norway. Magnus Smek was at his accession king of Norway and Sweden, but in 1355 Norway became nominally independent, with Haakon VI., son of Magnus, as ruler. Haakon married the Danish princess Margaret, who on the death of her husband and son became ruler of both Norway and Denmark (See MARGARET). In 1397, by the Union of Kalmar, Margaret brought Sweden also under her sovereignty.

Sweden became independent in the sixteenth century, but Denmark and Norway remained under one rule until 1814. Norway declined in prosperity and importance after the middle of the fourteenth century, when the Black Death ravaged the country and greatly reduced the population. The union with Denmark, too, was far from beneficial to the country, as the kings regarded Denmark as the more important country and treated Norway merely as a province. The long union with Denmark was ended by the Napoleonic struggle, for Sweden demanded, as

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the price of her aid to the allies against Napoleon, Norway, which was taken from Denmark as a punishment for the adherence of the latter kingdom to Napoleon. The Norwegians refused, however, to agree to the Treaty of Kiel (January, 1814), which ceded the country to Sweden, declared their independence and adopted a free constitution. Bernadotte, the crown prince of Sweden, entered Norway with an army, and although he was not completely successful, the pressure which the other powers brought to bear compelled Norway to accept the Swedish proposals for union, by which Norway was allowed to retain her own constitution. Throughout the nineteenth century, Norway constantly resisted all attempts of Sweden to lessen in any way her constitutional rights. The feeling that Sweden, as the larger country, was in every way considered more than Norway, kept dissatisfaction alive throughout the country, and when, in 1905, King Oscar of Sweden refused the demand of the *Storting*, the Norwegian parliament, for a separate consular service, this refusal was made the occasion for declaring the independence of the country. As a proof that the separation was a friendly one, the *Storting* invited King Oscar to name one of his sons as king of Norway. Sweden was obliged to submit to the separation, which was arranged in the Treaty of Karlstad, concluded in September, 1905, but Oscar refused to accept the crown for his son, and Charles, brother of Christian X. of Denmark, was chosen ruler, taking the name of Haakon VII. Norway was the first European nation to grant suffrage to women on the same terms as men; local suffrage was granted them in 1901, and parliamentary suffrage in 1907.

Norwich, *nor'rich* or *nor'rij*, a city of England, situated on the Wensum River, 98 mi. n. n. e. of London. It is noted for its many old buildings, a number of which were constructed during the Middle Ages, and some of the ancient gates and fortifications are still retained. In the center of the city is an old Norman castle, built at about the close of the eleventh century. There is also a cathedral, noted for its great age and lofty spire, one of the highest in England. Years ago Norwich became the center of an important textile industry, which has continued until the present time. There are also manufactures of agricultural implements, machinery, shoes, mustard and starch. Brewing, dyeing and distilling are of considerable importance. Population in 1911, 121,478.

Norwich, CONN., one of the county-seats of New London co., 50 mi. s. e. of Hartford, on the Thames River, at the head of navigation, and on the Central Vermont and the New York, New Haven & Hartford railroads. The city is picturesquely located among the hills and has many fine residences, well-shaded streets and several public parks. It has excellent water power and contains extensive manufactories of firearms, cotton, silk and woolen goods, stoves, furniture and a large variety of machinery. There is also a valuable trade in lumber, coal, groceries, dry goods and other articles. The city has the Backus Hospital, the Otis Library, a Y. M. C. A. building and the Free Academy, which is well equipped and endowed. Saint Patrick's church and the courthouse are also notable structures. The place was settled in 1659 and was chartered as a city in 1784. Population in 1910, 20,367.

Norwich, N. Y., the county-seat of Chenango co., 45 mi. s. w. of Utica, on the Chenango River and on the Delaware, Lackawanna & Western and the New York, Ontario & Western railroads. It is in an agricultural district and contains stone quarries, blast furnaces, railroad shops, ribbon and glove factories, creameries and manufactories of drugs and other articles. The village has many fine residences, a hospital and a public library. The municipal building and the Lackawanna depot are also prominent structures. Population in 1910, 7422.

Norwood, MASS., a town in Norfolk co., 12 mi. s. w. of Boston, on the New York, New Haven & Hartford railroad. It contains several large printing establishments, railroad shops, a foundry, several tanneries and other factories. The town has the Morrill Library, with 7000 volumes. Population in 1910, 8014.

Norwood, OHIO, a city in Hamilton co., adjoining Cincinnati on the northeast, on the Baltimore & Ohio Southwestern, the Norfolk & Western and other railroads. It is a residence suburb of Cincinnati and has a beautiful location. There are also manufacturing establishments, which produce playing cards, book-cases, electrical apparatus, pianos, machinery, tools and other articles. The place was settled about 1790 and was incorporated as a city in 1902. Population in 1910, 16,185.

Nose, that part of the respiratory apparatus through which the air enters the lungs; also, the organ of smell. In most animals, the nose is the most prominent feature of the face. In

some of the lower animals, as the dog, it forms the muzzle, and in others, like the hog, tapir and elephant, it is prolonged into a proboscis.

The nose in man is a triangular pyramid, with a framework of bone and cartilage. The bony portion of the framework consists of the nasal bones, the vomer and the turbinatè bone (See SKELETON, subhead *Skull*). The cartilage is attached to the vomer, completing the partition between the nostrils, and to the nasal bones, completing the framework at the sides. The nose contains front and back passages, known as the *nares*. The front pair form the *nostrils*, through which the air enters. These passages are lined with a mucous membrane, in which, in the upper part of the nostrils, the fibers of the *olfactory nerve* are distributed. These fibers, as well as numerous blood vessels, pass through small openings on each side of the ethmoid bone. See SMELL.

Nosology, *no sol'o jy*. See MEDICINE.

Notary Public, an officer authorized to attest or certify legal documents. In the United States, notaries are appointed by the governors of the states, and their jurisdiction extends only to the limits of the particular division for which they are appointed. Any male citizen is eligible to appointment, but some states compel notaries to give bonds for faithful performance of their duties. Usually a notary's seal must be affixed to important legal instruments. A notary may acknowledge legal documents, as deeds or mortgages; may take depositions of evidence, and in some states may exercise the powers of a justice of the peace. The notary is disqualified from acting in any matter in which his own interests are involved.

Nota'tion and Nu'mera'tion. See ARITHMETIC; ALGEBRA.

Notes, in commerce. See PROMISSORY NOTE; NEGOTIABLE INSTRUMENTS.

Notre Dame, *no'tr' dam*, CATHEDRAL OF, the cathedral of Paris, one of the most famous in France, built during the thirteenth century. It is situated on the Seine River and is in simple Gothic style. There are two massive towers on the west front, and the roof is supported by heavy flying buttresses. During the French Revolution Notre Dame was converted into a Temple of Reason, and the statue of the Virgin gave way to the goddess of reason.

Notre Dame, UNIVERSITY OF, a Roman Catholic school of collegiate degree, established at Notre Dame, Ind., in 1842. The school maintains thirteen collegiate courses, and also

courses in art and music. The institution is particularly well equipped for work in applied science, and its science building and furnishings are valued at \$500,000. There are several schools for brothers, novices and young priests, affiliated with the university. It also has several preparatory schools in different parts of the country. The faculty numbers over sixty, and the enrollment is about 1000. The library contains 56,000 volumes, and the buildings and grounds are valued at over \$2,000,000.

Nottingham, *no'ting am*, a city of England, located in the County of Nottingham, on the Trent, 108 mi. n. by w. of London. The city is well built, with broad streets and good market places. The most important buildings are the Nottingham castle, which is now an important art museum, the exchange, the postoffice and the townhall. The most noted churches are the Church of Saint Mary, the Church of Saint Peter and the Roman Catholic cathedral. The city is the seat of Nottingham University College. It also contains a mechanics' institute and school of art and has a public library of over 100,000 volumes. The chief industry is the manufacture of lace. Other industries include the spinning of wool, cotton and silk, the manufacture of hosiery, chemicals, foundry products and machinery. The county is celebrated in literature as the scene of the adventures of Robin Hood. Population of the city in 1911, 259,904.

Noun, *noun*, in grammar, a word that names any object about which a statement can be made. A noun is called *proper* when it is the name of an individual person or thing; *common*, when it is the name of a class of objects; *collective*, when in the singular it names a collection of similar objects; *concrete*, when it names material objects; *abstract*, when it names a quality, condition or action.

Nova Scotia, *no'va sko'sha*, a province of the Dominion of Canada, consisting of the peninsula of Nova Scotia and the island of Cape Breton, which is separated from the peninsula by the Gut of Canso. Nova Scotia is bounded on the n. by Northumberland Strait; on the n. e. by the Gut of Canso; on the s. e. and s. w. by the Atlantic Ocean, and on the n. w. by the Bay of Fundy and New Brunswick. The peninsula has a length of about 280 mi., and in width it varies from 50 to 100 mi. The area of the province is 21,428 sq. mi., or about the same as that of Maryland and Massachusetts combined. The coast has numerous indentations, which form excellent harbors.

SURFACE AND DRAINAGE. In general, Nova Scotia consists of low land, sloping gradually to the southwest. Along the shore of the Bay of Fundy are the North Mountains, which extend with slight interruptions across the peninsula from the southwest to the northeast. On the north of the Basin of Minas these are known as the Cobequid Mountains or Hills. They are a continuation of the Appalachian system, but do not here reach a great altitude, nowhere exceeding 1000 feet.

The Annapolis River flows southwesterly in the valley between the North and South Mountains and drains the southwestern part of the province. Other portions are drained by short streams, which are unimportant. The southern and east central portions contain a number of lakes, some of which are mere arms of the sea, nearly enclosed by land. The most important lake in the peninsula proper is Rossignol, in the southern portion. In the south central part of Cape Breton Island is Bras d'Or Lake, which is really an arm of the sea. See CAPE BRETON.

CLIMATE. Being nearly surrounded by water, Nova Scotia has fewer sudden changes and extremes of temperature than New Brunswick, but it is subject to heavy fogs. The winters are not intensely cold, and the summers are mild and equable, the highest temperature at Halifax seldom exceeding 86°. The annual rainfall is about 45 inches.

MINERAL RESOURCES. Nova Scotia contains some of the most valuable coal deposits in North America, and these are extensively worked, the annual output amounting to over 7,000,000 tons. The coal is exported to the other Canadian provinces and to the New England states. There are also large deposits of iron ore and deposits of manganese and gypsum on Cape Breton, while antimony is found in the vicinity of Halifax. As yet none of these resources has been extensively developed, but the presence of iron ore, coal and limestone constitutes a condition favorable for the manufacture of iron and steel.

AGRICULTURE. The lowlands along the streams are specially fertile, and the equable climate and abundant moisture adapt Nova Scotia to the raising of hay, grains, root crops and fruit, all of which are produced in large quantities. Formerly the province was covered with forests, and wherever these have been cleared away the land is tilled. Among the cereals, oats, barley and wheat are the most important. Potatoes are extensively grown, as are root crops. The river valleys in the southern half of the

peninsula are specially well suited to the raising of fruit, and apples are grown and exported from this region in large quantities. Stock raising is also an important branch of industry, and considerable butter and cheese are made.

OTHER INDUSTRIES. The fisheries are among the most important resources of the province, and they give employment to a large number of people. The annual output is valued at from \$8,000,000 to \$10,000,000, making Nova Scotia second only to Massachusetts in the value of her fishing industries. Cod, halibut and lobsters are taken in the largest numbers.

The manufactures are not important. Some coke is made, and on the island of Cape Breton there are iron and steel works. Lumber is manufactured in some regions, and the tanning industry is of some importance. The other industries worthy of mention are the manufacture of cotton goods, the canning of fruit and the manufacture of sugar.

TRANSPORTATION. Its extensive coast line and numerous harbors give Nova Scotia excellent facilities for communication by sea. Halifax is its most important seaport and has regular steamship connection with European ports, as well as with those of Canada and the United States. The Inter-Colonial railway extends the length of the province and has terminal stations at Halifax, Shelburne and Louisburg, so that most of the counties have direct railway communication.

GOVERNMENT AND RELIGION. The province has a legislature consisting of a council and a house of assembly, and the executive authority is vested in a lieutenant governor, appointed by the governor-general of Canada. For local administration the province is divided into counties, and these are divided into towns.

The inhabitants are largely of English, Scotch and Irish descent. The Protestant denominations, including Presbyterians, Baptists, Episcopalians and Methodists, all have large followings. About one-third of the inhabitants are communicants of the Roman Catholic Church.

EDUCATION. The public schools are in charge of a council of public instruction, which comprises the members of the governor's executive council, and the superintendent of education is the chief executive officer. The schools are undenominational and uniform throughout the province as to grading and courses of study. Each county has an academy, and there is a normal school for the training of teachers. There is no provincial university, but there are

a number of colleges, maintained by the different religious denominations.

CITIES. The chief cities are Halifax, the capital; Sidney, on Cape Breton; Yarmouth, Pictou and New Glasgow.

HISTORY. Nova Scotia was first visited by Cabot in 1497, but it was not colonized by Europeans till 1604, when French settlements were made at Port Royal, Saint Croix and other places. Under the French, Nova Scotia, with New Brunswick, was known as *Acadia*, or *Acadie*. The French colonists were more than once almost entirely driven out by the English. In 1654 Cromwell took possession of the country, which remained with the English till 1667, when it was ceded to France; but in 1713 the country was again ceded to England. In 1755 almost all the French colonists were forced to leave the country, owing to their hostility to the English. In 1763 the island of Cape Breton was annexed to Nova Scotia, but it was separated between 1784 and 1820. In 1784 New Brunswick was detached. In 1867 the province became a member of the Dominion of Canada. Population in 1911, 492,338.

No'va Zem'bla, two large islands in the Arctic Ocean, belonging to Russia and lying north of the northeastern corner of European Russia. The two are separated from each other by the Strait of Matotchkin Shar and from the mainland of Russia by Kara Strait. The total area of the two islands is about 35,150 square miles. The coasts swarm with seals, fish and water fowl. The interior is covered with stunted shrubs, short grass and moss, and the animals include bears, wolves, foxes, reindeer, ermines and other fur-bearing animals. The islands are almost uninhabited, but Russian hunters and fishers visit them constantly.

Nov'el, a prose narrative that has a definite plot and involves portrayures of character and descriptions of scenery. In this broad sense the term includes the *romance*, but in general it may be said that the romance is to be distinguished from the novel by its ideal, marvelous or mysterious subjects and situations. Story telling, out of which by successive stages the novel has grown, is of great antiquity. Ancient Egypt had a large stock of tales which, when they became current in Europe, centuries later, were found to possess an interest of their own, quite apart from their historical value. India produced in the sixth century A. D. a romance called *The Adventures of the Ten Princes*, similar in character to *The Arabian Nights*, which appeared

later in Arabia. Fiction in Japan, which began with short narratives, did not become of importance until the eleventh century, when appeared the first long tale, a romance of love; while in China, the novel did not develop until two or three centuries later. Among the Greeks and Romans novels were produced in small numbers, the first product of the Greeks being the *Milesian Tales*, none of which is extant. The most famous Greek name in this connection is Heliodorus, who lived in the fourth or fifth century and who wrote a romance of love. Of the Latin romances, the most notable is the *Golden Ass* of Apuleius, in which is related the beautiful story of Cupid and Psyche. Fiction during the Middle Ages took at first the form of the metrical romance, out of which grew gradually the romance of adventure in prose and verse and finally, the prose tale. Of the medieval type of fiction, the best specimens are *Aucassin and Nicolette* and the *Canterbury Tales* by Chaucer.

The first novel, using the term in something like the modern sense, appeared in the *Decameron* of Boccaccio (about 1353), which furnished the model for innumerable works during the many years which followed. During the sixteenth and seventeenth centuries, the growing cosmopolitanism of Europe and the consequent advent of new modes of thought and expression from the East gave an impetus to novel writing such as it had never felt before. The invention of printing, too, made it natural that the old romance in verse, adapted to singing or reciting, should give place to prose. From 1475 on, in England, Caxton printed numerous romances, among which the *Morte d'Arthur* (1485) marked a distinct advance. In 1515 appeared Sir Thomas More's *Utopia*, a dream of an ideal socialistic state. Much of the credit for the development of the structural forms of the novel is due to Spain. *Amadis of Gaul* (1470) is among the first prose romances in modern form; while to this period in Spain belong also the *picaresque*, or rogue, stories and, most famous of all, the *Don Quixote* of Cervantes, intended as a burlesque on the exaggerated romance of chivalry. Great as was the Elizabethan Age in English literature, it produced little of importance in fiction. Sir Philip Sidney's *Arcadia*, Lyly's *Euphues* and Nash's *Unfortunate Traveler* complete the list of novels to the seventeenth century.

A great step in the progress of the novel was marked by the appearance, late in the seventeenth century, of Bunyan's *Pilgrim's Progress*,

which presented the only true and definite picture of human life which the seventeenth century in England produced. And when, early in the eighteenth century, a man appeared who had all of Bunyan's narrative powers and ability to make a story real by the addition of telling details, and who told his stories without allegory, the history of the modern novel had begun. This first novel, in the modern sense, was Defoe's *Robinson Crusoe* (1719). Seven years later appeared Swift's *Gulliver's Travels*, the greatest example of satire in fiction. Under Richardson and Fielding the novel of everyday life was greatly improved, and its dramatic element was emphasized. From that time the novel has changed little structurally. The works of Smollett and Sterne show that prose fiction had, in a certain sense, degenerated. The object was no longer to picture life as it was, but simply to cater to the demand for amusement of a coarse kind. Sterne has given us in *Tristram Shandy*, however, one of the great character portraits in fiction—Uncle Toby. In Goldsmith's *Vicar of Wakefield*, the coarseness and brutality which had characterized the works of previous authors disappeared, and a cleaner and fresher atmosphere was introduced.

A differentiation in the kind of novels began, in the late eighteenth and early nineteenth centuries, to make itself felt. The "novel of manners," as it may be called, began with Frances Burney's *Evelina* and reached its highest point in the works of Jane Austen. Peculiarly characteristic, however, of the early nineteenth century are the romantic historical novels of which Scott, if not exactly the creator, was the greatest writer. He lent a great impetus to English novel writing, and since his day, among authors in England, novel writers have been much the most numerous class. Among the authors who followed Scott, and in some of whom his influence may be strongly felt, were Lever, Mrs. Craik, Disraeli, Bulwer-Lytton, Dickens, Thackeray, Charlotte Brontë, Trollope, Kingsley, Marryat, George Eliot, Wilkie Collins, Mrs. Oliphant, Miss Yonge, Hughes, Reade, Black, Hardy, Blackmore, Besant, Rider Haggard, Stevenson, George Meredith and George MacDonald. Of the more modern British novelists the most important are Kipling, Mrs. Humphrey Ward, James M. Barrie, John Watson (Ian Maclaren) and Anthony Hope. Among the French the novel is best represented by the works of Daudet, Maupassant, Zola, Hugo, Chateaubriand, Madame de Staël, Dumas

(father and son), Balzac, George Sand and Mérimée. The most noteworthy names in the German group of novelists are Gutzkow, Auerbach, Freytag, Heyse, Ebers and Rosegger. As the leading representatives of other modern nations may be mentioned Turgeneff and Tolstoi, for Russia; Björnson, for Norway; Hans Christian Andersen, for Denmark, and Jokai, for Hungary.

In America the novel, like other forms of literature, was slow in developing, and received little attention until well on into the nineteenth century. Charles Brockden Brown was the first notable adventurer in the field, but his *Wieland* (1797) and *Clara Howard* were but weak attempts at realistic fiction. James Fenimore Cooper was also a pioneer, but he soon established an international reputation as a master of interesting adventure, winning by his thrilling sea and indian tales the title of "the American Scott." Washington Irving tried his hand at novel writing and won recognition, although his works, considered as novels, have many limitations. With Poe, American fiction reached its first great height, for his weird tales, full of mystery and strange psychological phenomena, still rank among the best of their kind. Notable among them are the *Murders of the Rue Morgue*, *Fall of the House of Usher*, *The Mask of the Red Death*, the *Pit and the Pendulum* and *Ligeia*. Poe had a worthy successor in Nathaniel Hawthorne, by whom American romance was brought to its greatest perfection, and who ranks, in conception of plot, portrayal of character and artistic execution, with the great novelists of his century. In 1851 was published Harriet Beecher Stowe's *Uncle Tom's Cabin*, which was noteworthy, not chiefly as a novel, but as a popular treatise on slavery.

Within the last half century, novel writing has greatly increased in the United States, and many prominent names may be mentioned in connection with its development. Oliver Wendell Holmes published two novels which, although somewhat careless in structure, give accurate portrayals of the New England character. Bret Harte, Hamlin Garland and Owen Wister have written of the far West in its various aspects; George W. Cable, Thomas Nelson Page and Joel Chandler Harris have done the same for the South, while Elizabeth Stuart Phelps, Mary Wilkins Freeman and Sarah Orne Jewett have made the types of New England character familiar throughout the country. Mark Twain, whose scenes are laid chiefly in

the Mississippi valley, makes a universal appeal through his genial humor. As examples of the realistic novel may be mentioned the works of William Dean Howells, studies of American types and life; the works of Henry James, studies of intricate psychological subjects, and the works of Edith Wharton, carefully drawn character portraits. Among writers who take as their theme animal life, the most prominent is Ernest Thompson Seton; while among those who have based their work on historical incidents may be mentioned Winston Churchill and S. Wier Mitchell. The number of historical novels within recent years has been exceedingly great, but few of them seem destined to live, and the political life and social conditions of the United States are gradually replacing in popularity the historical theme. Of the innumerable works of fiction which the last years have produced, there are few, or none, which may be regarded as approaching in any way the masterpieces of the past. For a fuller account of the works of the novelists mentioned in this article, see the name of each in its proper alphabetical position in this work.

Novem'ber, formerly the ninth month of the year, but according to the Julian arrangement, in which the year begins on January 1, November became the eleventh month and comprised 30 days.

Novgorod, or **Novgorod-Veli'ki** *nov'go rod ve lee'ke*, a city of Russia, capital of the government of the same name, on the Volkhov, about 2 miles from Lake Ilmen and 20 miles south of Petrograd. The river divides it into two parts; that on the left bank, with the kremlin and cathedral, is known as the Sophia side; that on the right bank is the commercial town. Novgorod during the Middle Ages was the largest and most important town of northern Europe. It was the cradle of the Russian monarchy, and in 1862 a monument was erected to commemorate the one thousandth anniversary of the foundation of the Russian State by Rurik. The trade and manufactures of the town are now unimportant. Population in 1908, 27,130.

No'vum Or'ganum (new instrument or method), the second part of Francis Bacon's great work, the *Instauratio Magna* (The Great Restoration), published in 1620. It lays down the principles of the modern inductive, or scientific, method, that of proceeding from facts to general laws, rather than inferring facts from insufficiently proved laws, after the manner of the old deductive logic.

N-Rays, the name given certain peculiar rays of light that were discovered by Professor Blondlot of the University of Nancy, while trying to polarize X-rays (See ROENTGEN RAYS; POLARIZATION OF LIGHT). The name is from the town of Nancy, in whose university the rays were first discovered. N-rays resemble X-rays in some respects and widely differ from them in others. They will penetrate most substances, but platinum, rock salt and water are opaque to them. They penetrate a dry cloth readily, but the thinnest fabric when wet obstructs them. They render such substances as calcium sulphide phosphorescent, provided these substances have been exposed to the sunlight before being acted upon by the N-rays. Experiments show that N-rays exist in sunlight, but are obstructed by clouds and moisture in the atmosphere. Their properties and use are not yet well understood. Attempts to use them in photography have not been successful.

Nu'bia, a name given to a region of north-eastern Africa, bounded by Egypt on the n., by the Red Sea on the e., by Abyssinia and Kordofan on the s. and by the Libyan Desert on the w. It is not now a political division, as part of the territory belongs to Egypt and the rest to Egyptian Sudan. With the exception of the valley of the Nile, the country is generally desert. Suakin, on the Red Sea, is the only practicable port. The Nubians belong to the Arabian and Ethiopian races. They are a handsome people, of dark brown complexion, bold and cheerful and more simple in their manners than their neighbors either up or down the river. From 1822 to the revolt of the Mahdi in 1884 and 1885, the country was subject to Egypt, to whose control it was restored by the victories of Lord Kitchener in 1896 and 1898. For an account of this restoration, see EGYPT, subhead *History*.

Nuisance, *nu'sans*, any reckless or inconsiderate use of one's liberty or property, which, without destroying the substance of other property, impairs its use and enjoyment. Nuisances are defined as of two kinds—*public*, or *common*, and *private*. Public nuisances are offenses against the public as a whole, as annoyances in highways, bridges and public rivers and injurious or offensive trades, which, when hurtful to individuals, or detrimental to public health or convenience, may be proceeded against in law and made to bear fine or damages. A private nuisance may be defined as an injury or annoyance to the person or property of an indi-

vidual, as where one projects the eaves of his house over those of his neighbor, stops or obstructs a right of way or carries on an offensive trade. Causing inconvenience to one's neighbors may not in itself be a nuisance at law; there must be positive discomfort or danger. Nuisance, whether private or public, is rather a civil than a criminal offense. The remedy at law for the injury of nuisance is either an action for damages, the abatement of the nuisance by the complainant's own act, provided he occasion no unnecessary damage, or an injunction.

Nul'lifica'tion, in American history, the attempt by a state formally to suspend a law of the United States within its territory. This right was first declared in the famous Kentucky and Virginia Resolutions of 1798, on the ground that the Union was a compact of independent states. The same right was asserted by the government of Pennsylvania in 1809 and was practically assumed by several New England states during the War of 1812. In 1825 Georgia successfully asserted its right against the government concerning a question of jurisdiction over indian lands. The most famous instance was in South Carolina in 1828, when John C. Calhoun, in an essay called the *South Carolina Exposition*, argued that each state was a sovereign in itself, the Federal government being its agent, and that the state therefore had the right to suspend a power which it had delegated to its agent. The same doctrine was upheld by Robert Y. Hayne in his famous debate with Daniel Webster in 1830.

In both cases the immediate cause of the declaration was the protective tariff policy which injuriously affected the South. In 1833 the legislature of South Carolina declared the tariff acts of 1828 and 1832 null and void and threatened secession if the government of the United States attempted to enforce the law. Measures of military defense were taken, but President Jackson issued a proclamation warning the people of the state of the results of their action and declaring his purpose to enforce the law at any cost. A bill known as the Force Bill (See FORCE BILLS) was passed in March, 1833, but compromise was meantime effected, and the nullification ordinance was repealed.

Nu'ma Pompil'ius, the second king of Rome, who is said to have reigned from 714 to 672 B. C. He was of Sabine origin, and was distinguished as a philosopher and legislator, though, like the other early kings, he has more a legendary than an historical existence. He was regarded as the

founder of the most important religious institutions of the Romans and left writings explanatory of his system, which were burned by order of the Senate when accidentally discovered 400 years after his time.

Number, the measure of the relations of magnitude existing between two objects of the same kind. An abstract number is the result obtained by the comparison of one quantity with another quantity, which is considered a unit of measurement; that is, the result of comparing the magnitude of 7 apples with that of 1 apple is the abstract number 7. When a concrete name is attached to a number, designating the nature of the quantity which is measured, the number is said to be concrete. Thus, the expression *7 apples* is a concrete number.

In common use, the term *number* also represents the idea of a single unit or thing and of a collection of units or things. Furthermore, the idea of nothing, or *zero*, of quantities or magnitudes less than nothing, or *negative quantities*, and of an immeasurable or inconceivable magnitude, or *infinity*, are also considered as numbers. Numbers are classified according to their divisibility as *odd* or *even* and *prime* or *composite*. An *odd* number is one that is not divisible by 2; a *prime* number is one that has no factors other than itself and 1. As to their structure, numbers are *rational* or *irrational*, *simple* or *complex*. An *irrational* number is one which cannot be expressed as a whole number or as a fraction; for example, $\sqrt{2}$. A *complex* number is one which expresses the sum of a real number and of an imaginary number (See IMAGINARY QUANTITY). As to their relation to a fixed point, called *zero*, numbers are *positive* or *negative* (See NEGATIVE QUANTITY). Certain numbers are also called *figurate numbers* (See FIGURATE NUMBER). Numbers which answer the question "How many?", such as 1, 2, 3, are called *cardinal* numbers, in distinction from those which answer the question "Which one of a series?", as *first*, *second*, *third*, which are called *ordinal* numbers. See NUMBER, METHODS OF TEACHING.

Number, METHODS OF TEACHING. Instruction in number should secure two results, namely, (1) comprehension of magnitude and magnitude relations and (2) ability to use figures accurately and with facility. At the outset the teacher should understand that numbers are not things or qualities of things, but that number is a relation, which is obtained only through mental processes.

PRIMARY GRADES. Children have more or less knowledge of number when they enter school. This is manifested by their tendency to count and to measure. A test will probably show that most of them know number as far as five and that all have the idea of magnitude. The work in these grades should proceed along the following lines:

(1) *Obtaining a knowledge of magnitude and magnitude relations.* This should be done by measurement, since measurement is the foundation of all number work. Pupils should at first be given objects of different sizes, such as blocks of different lengths, and encouraged to compare them. They will express the result of their comparisons in such terms as *larger* and *smaller*, *longer* and *shorter*.

(2) *Counting.* Pupils should be led to count by noticing the number of objects in different groups, as three marbles, four blocks, five flowers. A serious mistake is often made in teaching children to count by single objects, as by pointing to each of a series of blocks and counting one, two, three, four. Unless the child already knows what two, three and four are, he gets the idea that these words are names of the different blocks, rather than groups of objects.

(3) *Perfecting the idea of magnitude.* The ideas first obtained are vague, as expressed in comparisons, such as *larger*, *smaller*. The pupils should soon be led to form definite ideas of such dimensions as foot, inch, yard, pound, pint and other units of measure in common use. This should be done by using the measures. In primary grades this work will proceed very slowly and in connection with other lessons. In many well-graded schools, lessons in number are not given any separate period during the first year, but are given incidentally in connection with other lessons, such as nature study and language.

(4) *Obtaining an idea of proportion, or relative magnitude.* Pupils should be led to form ideas of the relations of objects of different sizes, such as the relation of an inch cube to a two-inch cube, of a prism two inches long and an inch square to one two inches long and two inches square, and of a pint to a quart. These ideas are obtained by the use of the objects, which should always be at hand when new work in number is attempted.

(5) *Learning to use figures.* Since figures are the symbols of numbers, they should not be introduced until the ideas which they represent

are fully understood. Ordinarily they may be introduced about the beginning of the second year. In their introduction the following order should be observed: (a) The idea should be represented by the object; (b) the idea should then be represented by the written word; (c) the written word should be followed by the figure. After the figures have been introduced, in the following lesson the pupils should be tested, so that the teacher may know that they understand what each figure represents. This can readily be done by asking the different pupils to bring the teacher the number of objects which the figure written upon the board represents.

(6) *Gaining habits of accuracy.* Accuracy is essential to success. Unless the teacher insists upon accurate work from the beginning, habits of carelessness are formed which are liable to affect the pupil all through his school life. Most errors result from hasty and careless observation; hence, the pupil should be led to observe carefully and to form definite and accurate conclusions. By continual persistence in this method, the habit of accuracy will be established.

(7) *Gaining facility in arithmetical operations.* As fast as the pupils obtain accurate ideas, they should be drilled in the use of these until they acquire facility. This can be accomplished by devoting a portion of the number period each day to review drills.

(8) *Memorizing the facts of number.* As fast as the facts of number are understood, they should be learned. These facts of elementary number are comparatively few. There are only forty-five in addition and sixty-four in multiplication. When these are learned, they carry with them the primary facts of subtraction and division, and all should be mastered by the time the child has completed his third year in school.

INTERMEDIATE AND GRAMMAR GRADES. In the intermediate grades the work in number usually passes to the work in arithmetic. This is different in degree, but not in kind. The text-book is usually introduced into the fourth grade, and unless the pupils have been prepared for this in the preceding grade the teacher should devote the first few lessons to such review as may be necessary to introduce the class to the book. The same methods employed in the primary grades should be continued and be extended as the needs of the class demand. Objects should be used whenever they are necessary to give the pupils a clear idea of the process under consideration.

In addition to the work in fundamental operations, the pupils of the fourth grade should acquire a clear idea of the common fractions in most general use. The primary idea of fractions should be obtained in the preceding grades, but here this idea should be elaborated and extended until the pupils are able to add and subtract fractions of different denominations as far as twentieths, by reducing them to equivalent fractions having the same denominator. The principles of the reduction of fractions can easily be learned by the use of drawings or paper, which can be folded to represent the necessary divisions.

Teachers often err in not making a distinction between an equal part of an object and one of a group of objects of the same sort, as using one of four apples to represent $\frac{1}{4}$. The difference between one of four apples and one-fourth of an apple should be apparent, but when one illustration is used for the other, it often leads to a confusion of ideas. The teacher should also see that the pupil has a correct idea of the unit value of his result. Failure to do this often leads to ridiculous conclusions. For instance, the division of $\frac{3}{4}$ by $\frac{1}{2}$ gives a quotient of $1\frac{1}{2}$, but when questioned as to what the $1\frac{1}{2}$ represents, the pupil is very likely to have the idea that the number represents $1\frac{1}{2}$ units or wholes.

Many practical problems should be given in these grades. In difficulty they should be kept within the capacity of the pupils, and they should deal with the affairs of daily occurrence. Common weights and measures, the use of decimals as applied to money and the simple computations found in stores should be thoroughly taught in the fourth grade. These problems should constitute a part of the seat work and a part of the recitation work. The seat work should be done with care and supervised by the teacher; otherwise pupils will fall into the very injurious habits of listlessness and inaccuracy. When this occurs the seat work is of little or no benefit.

Denominate numbers, as far as they are in common use, should be taught in the intermediate grades. This should be done by the use of common weights and measures and their application to such problems as occur in actual business. After these measures have been learned by use, their tables can be memorized. Pupils should also be taught, in connection with this work, to write receipts and promissory notes and to make out bills of items bought and

sold. In the higher grades the operations in percentage, including profit and loss, interest and discount should receive special attention, but the books used in these grades usually give such explanations as to render the discussion of special methods unnecessary.

Numbering Machine, a machine for impressing consecutive numbers on account books, coupons, railway tickets, bank notes and other forms of commercial papers. One of the principal forms of the apparatus consists of a series of disks or wheels, each numbered to ten on its circumference. All are mounted on one axle, upon which they turn freely, acting upon one another in serial order. The first wheel of the series, containing the units, is moved one figure by each stroke or movement, and when the units are exhausted, the tens come into action and act with the units, so that for every ten units marked off, one ten is marked off. When the disk of tens has moved ten times, the hundred disk moves once. Often there are wheels representing thousands and even ten-thousands.

Numbers, BOOK OF, the fourth of the books of the Pentateuch. It takes its name from the records which it contains of the numbering of the Israelites, the first given in chapters I-IV, and the second in chapter XXVI. It gives a narrative of the journeyings of the Israelites, from the time of their leaving Sinai to their arrival at the plains of Moab, besides portions of the Mosaic law. Formerly the authorship was attributed to Moses, but some modern scholars claim the book is made up of several parts, each of which has a separate author.

Numid'ia, an ancient country of North Africa, corresponding roughly to modern Algeria. It was divided among various tribes, but after the Second Punic War it was united under Massinissa, and several of its rulers became noted in Roman history. In 46 B. C. it became a Roman province, and at the division of the Roman Empire it became a part of the Western Empire.

Numismatics, *nu'miz mat'iks*, the science of coins and medals. The word *coin* is in modern times applied to those pieces of metal struck for the purpose of circulation as money, while the word *medal* signifies pieces of metal similar to coins, not intended for circulation as money, but struck and distributed in commemoration of some person or event. Ancient coins, however, are often termed medals. They are gold, silver, bronze, electrum or billon, and in ancient times they served not only as a currency, but

also as chronicleers of important political events and as abstracts of the times. It is also from coins alone that we derive our knowledge of some of the most celebrated works of ancient art, particularly of ancient statuary. In ancient, as in modern times, while the coins of empires or kingdoms were (at least in later times) distinguished by the head of the reigning prince, those of free states were distinguished by some symbol. Medieval coins include the Byzantine, the coins of the various European states from the fall of Rome to the accession of Charlemagne; the Carolingian currency, from Charlemagne to the fall of the Swabian house (1268); the coins of the early Renaissance, to 1450, and those of the classical Renaissance, from 1450 till 1600. Modern coinage may be said to begin with the dating of coins. Evidence shows that the origin of coinage in the Orient was quite independent of European coinage, and China is said to have had a coined currency in the third millennium B. C.

Num'mulite (Latin *nummus*, money; Greek, *lithos*, stone), a name common to fossils (See FORAMINIFERA) having somewhat the appearance of money. The shell has no apparent opening, and internally it contains a spiral cavity, divided by partitions into numerous chambers, communicating with one another by means of small openings. Nummulites vary in size from less than one-eighth of an inch to one and one-half inches or more in diameter. They occupy an important place in geology, on account of the prodigious extent to which they are accumulated in the lower Tertiary strata. They occur so abundantly in some parts of the Eocene formation, that the name of *nummulitic limestone* is given to the strata so characterized. This series is characteristic of the Old World, often attains a thickness of many thousand feet and extends from the western shores of Europe and Africa through Asia to the east of China. The pyramids of Egypt are constructed of a stone largely composed of nummulites.

Nun, a word of unknown origin, but supposed to be connected with a Coptic word signifying "pure." In the Roman Catholic Church it is applied to a woman who retires from the world, joins a religious sisterhood, takes upon herself the vow of chastity and the other vows required by the discipline of her convent and consecrates herself to a life of religious devotion. Nearly all the masculine religious orders had corresponding feminine institutions, while there were also numerous independent orders of nuns. At

present the number of nuns is largely in excess of that of monks. The first nunnery is said to have been that founded by a sister of Saint Anthony, about 250 A. D., and the first in England was founded at Folkstone, by Eadbald, king of Kent, in 630.

Nunc Dimit'tis (now lettest thou depart), the first two words of the Latin version of the canticle of Simeon, given in *Luke* II, 29-32. It is used as the designation of the whole canticle, which forms part of the evening service in the *Book of Common Prayer*.

Nuncio, *nun'she o*, an ambassador of the first rank (not a cardinal) representing the pope at the court of a sovereign entitled to that distinction. A papal ambassador of the first rank, who is at the same time a cardinal, is called a *legate*. The title of *internuncio* is given to an ambassador of inferior rank, who represents the pope at minor courts. Formerly the papal nuncios exercised the supreme spiritual jurisdiction in their respective districts, but now, in the Catholic kingdoms and states which hold themselves independent of the court of Rome in matters of discipline, the nuncio is simply an ambassador.

Nuremberg, *nu'rem burg*, (German, *Nürnberg*), a city of Bavaria, on the Pegnitz River, 95 mi. n. of Munich. It is surrounded by well-preserved ancient walls, with numerous massive towers and gateways, and the whole is enclosed by a dry moat. The Pegnitz, traversing the town from east to west, divides it into two nearly equal parts, which communicate by numerous bridges. It contains a large market place and a number of interesting buildings, among which are the Church of Saint Lawrence, the Church of Saint Sebaldus and the medieval imperial castle, the Kaiserburg. The general appearance of the city is distinctly medieval, and it is one of the quaintest cities of Europe.

Nuremberg has extensive breweries and produces, also, large quantities of toys, fancy articles in metal, carved wood and ivory, as well as chemicals, clocks, watches, cigars, lead pencils and electric supplies. The town is celebrated for the invention of watches in the fifteenth century. Nuremberg was an independent imperial town down to 1806. It was one of the first of the imperial towns to cast its lot for the Reformation, and it suffered extensively during the Thirty Years' War, when Gustavus Adolphus was besieged there by Wallenstein. Before the discovery of the water passage to India, Nuremberg was the great mart for the produce of the East coming from Italy and going to the

north. Its trade, though it has declined somewhat, is still important. Population in 1910, 333,142.

Nurse, one who tends or takes care of the young, sick or infirm; specifically, a female hospital attendant. There are now numerous institutions where active, intelligent and physically able women are thoroughly trained for this work. In the larger schools or hospitals the course of study covers two or three years and gives not only an understanding of the theories of all departments of nursing, but also a varied practice at the bedside of invalids. The first class to graduate in the United States was sent from the Bellevue Training School in New York City in 1872. The system of sending trained nurses to the seat of war originated with Miss Florence Nightingale during the Crimean War, and organizations for military nursing are now common to all civilized countries.

Nurs'ery, in agriculture, a tract of land devoted to raising shrubs and trees for sale. In its broadest sense the term includes the culture of herbs and plants, as well as trees and shrubs, but in the United States the meaning is restricted as shown above. Nurseries exist for the purpose of supplying ornamental trees and shrubs, shade trees and fruit trees. The industry is the most fully developed in the western part of New York, in the vicinity of Rochester. Fruit nurseries are usually given to the raising of apple, peach, prune and other plum trees, and grape vines, and occasionally to the growing of shrubs that produce small fruits, such as the blackberry and the raspberry. However, in the United States, by far the largest part of the nursery business is confined to the growing of apple trees. Most of these trees are grown by grafting the scions into native stock (See GRAFTING). According to the United States census in 1900, there were 4500 nurseries in the country, and the capital invested in the business amounted to \$52,500,000.

Nut, a hard, one-seeded fruit, containing an oily meat enclosed in a shell. The most common varieties of nuts are the hazelnut, the chestnut, the English walnut, the hickory nut, the pecan and the Brazil nut. The Brazil nut and the cocoanut are products of tropical climates. Almonds, English walnuts, chestnuts and pecans are grown successfully in California and in some other parts of the United States. The walnut crop and the almond crop of California are both valuable.

Nuts are valuable for food, since they contain

Nutation

suitable proportions of fat and other nutritive matter. When eaten in connection with other food, they are found to be digestible and healthful, and they are now quite extensively used in the preparation of food products.

Nuta'tion, in astronomy, a small, subordinate, vibratory movement of the earth's axis, by virtue of which, if it subsisted alone, the pole would describe among the stars, in a period of about nineteen years, a minute ellipse, having its longer axis directed toward the pole of the ecliptic, and the shorter, of course, at right angles to it. The consequence of this real motion of the pole is an apparent approach and recession of all the stars in the heavens to the pole in the same period; and the same cause will give rise to a small alternate advance and recession of the equinoctial points, by which, in the same period, both the declinations and the right ascensions of the stars will be also alternately increased or diminished. This nutation, however, is combined with another motion, namely, the precession of the equinoxes, and in virtue of the two motions, the path which the pole describes is neither an ellipse nor a circle, but a gently undulating ring; and each of these undulations constitutes a nutation of the earth's axes. Both these motions and their combined effect arise from the action of the sun and moon upon the earth.

Nut'cracker, a bird common in the mountains of central Europe and sometimes seen in



NUTCRACKER

England. It belongs to the crow family and is about the size of a jackdaw. Its name is due to its habit of cracking the nuts of fir trees by striking them, much as a woodpecker strikes a tree.

Nut'hatch, the common name of several very active little birds, that are common in most

Nutmeg

parts of North America and Europe. They are usually of shy and solitary habits, frequenting the woods and feeding chiefly on insects, which they find in the crevices of the bark of trees.



NUTHATCH

They are usually seen head downward, working around the trunk of the tree, peering sharply into the crevices and steadily calling out their rough cries—nasal notes which seem altogether too loud for such small birds. The white-breasted nuthatch of the United States is of a slatish-gray color, with brownish lower parts, white throat and a white line over its eye.

Nut'meg, the kernel of the nearly spherical fruit of a tree growing principally in the islands of Banda, in the East Indies. The fleshy part



NUTMEG

a, fruit bursting open; *b*, the same, with one valve removed, showing the seed; *c*, section of seed; *d*, seed with the covering removed.

is of a yellowish color without, almost white within, and opens into two nearly equal longitudinal valves, presenting to view the nut, surrounded by the *mace*. The nut is oval, the shell very hard and dark brown. This immediately envelops the kernel, which is the nutmeg commonly used in commerce. The tree has been introduced into Sumatra, India, Brazil and the West Indies. It reaches the height of twenty or thirty feet and produces numerous

Nutrition

branches. The color of the bark of the trunk is a reddish-brown; that of the young branches, a bright green. The nutmeg is aromatic, is pleasing to the taste and smell and is much used in cookery. It yields, by distillation with water, a transparent oil, called oil of mace or oil of nutmeg.

Nutrition, *nu trish'un*, the act or process by which vegetables and animals are able to absorb into their systems their proper food, thus promoting their growth or repairing the waste of their tissues. The nutrition of the human body implies "the reception of food; the digestion of food; the absorption of digested food, which must be carried to every organ; the absorption of oxygen in the lungs, which the blood must carry to every organ; assimilation, or the building up of new tissue from material brought by the blood; the taking up of waste which has been produced by the oxygen combining with tissue; the carrying of this waste to the excretory organs." See DIET; DIGESTION; FOOD; RESPIRATION.

Nux Vom'ica, the fruit of a species of *strychnos*, which is found in various parts of the East



NUX VOMICA

Indies. It is about the size and shape of a small orange and has a very bitter, acrid taste. It is a virulent poison, and from it is prepared an extremely poisonous drug. See STRYCHNINE.

Nymphs

Nyassa, *nyas'sa*, a large lake in southeastern Africa, s. e. of Lake Tanganyika. It is about 340 miles long, about 40 miles wide, and has an area of 14,200 square miles. The surface is over 1500 feet above the sea level, and the waters are sweet and abound in fish. The lake is drained southward by the Shire River, a tributary of the Zambezi. Lake Nyassa was discovered in 1859 by Livingstone. There are missionary stations and trading stations on the shores, and a road has been constructed between Nyassa and Tanganyika.

Nyassaland, *nyas'sa land*. See BRITISH CENTRAL AFRICA.

Nye, EDGAR WILSON (1850-1896), an American humorist, better known as *Bill Nye*. He became famous as a humorous lecturer, writer, and story-teller. *Bill Nye and the Boomerang*, *Forty Liars and Other Lies and Chestnuts* are the titles of some of his volumes, full of puns and witticisms. He wrote also *A Comic History of the United States* and *A Guest at the Ludlow*, a collection of humorous sketches and stories. Mr. Nye was born in Shirley, Maine, spent his childhood in Wisconsin, was admitted to the bar in Wyoming, settled finally in New York and died near Asheville, N. C.

Nylghau, *nil'gaw*, a species of antelope a little larger than a stag, inhabiting the forests of northern India and Persia. The horns are short and bent forward; there is a beard under the middle of the neck; the hair is grayish blue. The female has no horns. The nylghau is much hunted as one of the noblest beasts of the chase, the skin of the bull being in demand for the manufacture of native shields. The name nylghau literally means *blue ox* and has, doubtless, been applied to this animal from the ox-like proportions of its body.

Nymphs, *nimfs*, in mythology, a numerous class of inferior divinities, imagined as beautiful maidens, not immortal, but always young, who were considered as tutelary spirits, not only of certain localities, but also of certain races and families. They occur generally in connection with some other divinity of higher rank, and they were believed to be possessed of the gift of prophecy and of poetical inspiration. Those who presided over rivers, brooks and springs were called *Naiads*; those over mountains, *Oreads*; those over woods and trees, *Dryads* and *Hamadryads*; those over the sea, *Nereids*.



O, the fifteenth letter and fourth vowel in the English alphabet. In form, the letter is derived through the Greek and Latin from the Phoenician, its pictograph having been, probably, an eye. In English, *o* represents two main sounds—the “long *o*” sound, in *note*, *go*; and the “short *o*” sound, in *not*, *got*. Besides these, it has several other sounds—the *oo* sound in *move*; the shortened sound corresponding to this, as in *wolf*, and the short *u* sound, in *love*. It is also a common element in digraphs, as *oo*, *oa*, *ou*.

because the fruit appears in the form of a nut held in a cup, like the acorn. Oaks are characterized by widely-branching tops, by leaves that are usually deeply indented at the margins, by small, inconspicuous flowers, which appear in catkins, and by having acorns for fruit. The bark is dark gray or almost black, the wood is hard, coarse-grained and strong. The ilex of Europe and the live oak of the United States are evergreens. All the other species shed their leaves. In size the species range from trees 100



OAK LEAVES

a. Bur oak.

b. Live oak.

c. Willow oak.

d. White oak.

Oahu, *wah'hoo*, the most important of the Hawaiian Islands. It has an area of 600 square miles and is quite generally fertile. The city of Honolulu, the capital of the territory, is situated upon the island. The surface is mountainous and contains several volcanic peaks and many inactive craters. The fertile land is in the valleys and on the low plains. The population in 1910 was 82,028. See HAWAII.

Oak, *oke*, a genus of hardwood trees, found extensively in the north temperate zone. They belong to the cup-bearing family, so called

feet or more in height to small shrubs.

The oak has always been recognized as one of the noblest trees, and it has often been styled the “Monarch of the Woods.” In the traditions of Europe and a great part of Asia the oak appears as an important element in religious and civil ceremonies. Large oak forests are found in England, France, Germany and most of the other countries of northern Europe. In the United States the oak is common from Canada to the Gulf of Mexico and as far west as the Mississippi River.

Oakland

The most common species in this country are the white oak, the red oak, the bur oak and the live oak. The *white oak* is found from Lake Winnipeg, in Canada, to the Gulf of Mexico. It is a large tree, with a stout trunk, and when growing in open spaces it has large, spreading branches. The wood is tough and hard and of a reddish-brown color and is extensively used for numerous purposes where strong wood is required. The *red oak* rivals the white oak in size. When the leaves appear in the spring they are pink, and in the autumn they change to a deep purple. It is from this characteristic that the tree takes its name. It is found in about the same localities as the white oak, and its timber is of equal value. The *bur oak* is a small species, characterized by its rough bark, irregular branches and dark-colored, coarse-grained wood. The tree is of but little value except for fuel. The *live oak* is found in the Southern states and along the Atlantic coast as far north as Virginia. It often grows to a large size and has oval, dark green leaves, which remain on the tree through the year. It is a valuable timber tree. Among the foreign species the *British oak* in England and in the forests of other European countries closely resembles the white oak. *Cork oak*, common to Spain and Portugal, is valuable for its bark, which is the source of cork (See CORK).

Oak lumber is used in finishing interiors, in the manufacture of furniture, in shipbuilding, in making frames for machinery and carriages and in basketry, especially in the manufacture of baskets for packing fruit and vegetables. The bark is valuable for tanning. About 1,005,000,000 board feet of oak lumber are made in the United States every year. See FORESTS; LUMBER; TANNING.

Oak'land, CAL., the county-seat of Alameda co., situated on the east side of San Francisco Bay, 6 mi. from San Francisco, and on the Southern Pacific, the Atchison, Topeka & Santa Fé and other railroads. The city is built upon a nearly level tract of land and is regularly laid out with broad, well-paved streets, which are shaded by live oaks, palms and other trees. Oakland is the favorite place of residence for many San Francisco business men, and it is noted for its beautiful residences and pleasant streets. It has an excellent harbor and is connected with San Francisco by large steam ferries. It is the site of the California Military Academy, California College, Pacific Theological Seminary and a number of other educational

Oats

institutions. The industries include iron works, foundries and machine shops, smelting works, cotton, flour and planing mills and tanneries. The destruction of the business portion of San Francisco by the earthquake and fire in April, 1906, caused considerable of the business formerly located in that city to be transferred to Oakland and temporarily, at least, increased the latter city's importance as a commercial and industrial center. Population in 1910, 150,174.

Oakum, *oke'um*, the substance of old tarred or untarred ropes, untwisted and pulled into loose fibers. It is used for caulking the seams of ships, stopping leaks and similar purposes. That formed from untarred rope is called white oakum.

Oa'sis, originally the name of the fertile spots in the Libyan Desert, where there are springs or wells and more or less vegetation, but now applied to any fertile tract in the midst of a waste, and often used figuratively. The oases of northern Africa are generally river valleys, the waters of which are for the most part underground, or depressions, surrounded by short ranges of hills, from which small brooks descend, sometimes forming lakes. In recent times oases have been formed in the Northern Sahara and in the desert regions of the United States by the sinking of artesian wells. There are many important oases in the Western Sahara, in the Libyan Desert, in Arabia, in Persia, and in the Desert of Gobi in Central Asia. In ancient times the most celebrated oasis was that to the west of Egypt, containing the temple of Jupiter Ammon, now called the Oasis of Siwah. See DESERT.

Oats, an important grain. The cultivated species of oats are subdivided into a large number of varieties, which are distinguished from one another by color, size, form of seeds, quality of straw, period of ripening, adaptation to particular soils and climates and other characteristics. The yield of oats



OATS

soils and climates

varies from twenty bushels to eighty bushels per acre, according to soil and climatic conditions. The weight per bushel varies from thirty to forty-five pounds, and the meal product is about half the weight of the oats. Oatmeal is a cheap and valuable article of food, and its value seems to be becoming more appreciated among the wealthier classes, as it is being neglected by the poorer; but the grain is raised chiefly for food for horses. The annual crop in the United States is about one billion bushels. Illinois, Iowa, Wisconsin, Minnesota and Nebraska, in the order named, produce the largest quantities, but oats are raised in nearly all states. The wild oat is supposed to be the original of all the species.

Obelisk, a column of rectangular form, diminishing toward the top, usually terminating in a low pyramid. Egypt abounded in obelisks, which were dedicated to the sun god and were usually erected to record the honors or triumphs of the monarchs. They were generally in the form of a single block of hard stone, and all four sides were inscribed with hieroglyphics. The two largest obelisks were erected by Sesostris in Heliopolis, each 180 feet in height. These were removed to Rome by Augustus. In the Place de la Concorde, Paris, is an obelisk which was brought from Luxor in 1833, and in front of the Church of the Lateran at Rome is one from Heliopolis, brought to Italy in 1588. This one is 104 feet high. Besides these, are the two known as Cleopatra's Needles, which are now in London and New York (See CLEOPATRA'S NEEDLES). Several obelisks still remain in their natural position in Egypt. The largest of these is in the temple of Karnak. This and its companion obelisk are made of red granite and were erected about 1600 B. C. by Queen Hatasu, who had them quarried from the red granite of Assuan, shipped to Karnak and set up in their present position within the space of seven months. Besides those of Egypt, obelisks of smaller size have been found in the ruined cities of Nineveh and Nimrud. Those which were common to Rome, Florence and other cities had all been removed from Egypt during its government by the Roman emperors.

Oberammergau, *o'bur ahm'mur gow*, a village in Upper Bavaria, celebrated for the performance, every ten years, of the passion play of Christ's crucifixion and ascension. See PASSION PLAY.

Oberlin College, an institution of higher learning, established at Oberlin, Ohio, in 1833.

It has a collegiate department and a preparatory school; also, departments of music, art and physical training, and a summer school. It has about 160 instructors, 1800 students and a library containing 125,000 volumes. Oberlin has always been a leader in educational movements and was the first college to admit colored students.

Obi, *o'be*, or **Ob**, a river of Siberia, which rises in the Altai Mountains, flows n. w., then n., through the governments of Tomsk and Tobolsk, and after a course of about 2500 miles empties into the Arctic Ocean through an estuary, the Gulf of Obi. Its chief tributaries are the Irtysh, the Tchulim and the Tom, and the most important towns on its banks are Barnaul, Kolyvan, Naryn, Surgut and Obdorsk.

Object Glass or **Objective**, a double-convex lens, used for forming an image of the object seen through the magic lantern, microscope and the telescope. For an explanation of its workings, see articles under those heads.

Oboe, *o'boi* or *o'bo ai*, or **Hautboy**, one of the most ancient and important wind musical instruments, consisting of an ebony or rosewood box, divided into three pieces, which, when joined end to end, are about twenty inches long. It has a bell-shaped mouth, from which a small tube, in which is inserted a smaller brass tube, containing a vibrating reed, extends to the other end of the instrument.

Observatory, *ob zurv'a to ry*, a building devoted to the observation of astronomical, magnetic, meteorological or other natural phenomena. The astronomical observatory is the one of most general interest. The first European observatory was built at Nuremberg by Bernhard Walther in 1472, and this was followed in the sixteenth century by Tycho Brahe's famous observatory on the island of Hveen, near Copenhagen, while another was erected by the Landgrave of Hesse at Cassel, in 1561. Through the labors of Brahe practical astronomy became associated with the universities, and many of them founded observatories. In the United States observatories have been established at Cambridge (1839), at Washington, D. C. (1845), and in many other places. Among the most noted are the Lick Observatory, in California (1888), and the Yerkes Observatory (1897), located at Lake Geneva, Wis.

The chief function of the observatories in connection with universities is usually that of teaching, but many valuable observations have been made, and in some institutions a large part

Obsidian

of the funds are turned in this direction. The national observatories, of which Greenwich Royal Observatory, England, and the Naval Observatory, Washington, D. C., are the best examples, are devoted entirely to the study of astronomical subjects and their application to governmental affairs.

The observatory building must be constructed in a very stable manner, and all the instruments must be kept free from motion, in order to permit the delicate observations that are necessary. Accordingly, foundations separate from the rest of the building are erected, and the instruments are placed on these so that they are entirely out of contact with the walls. The chief instruments used in the observatory are the telescope, which may be in either of two forms; the transit instrument, and the sidereal and the solar clocks.

Obsid'ian, a volcanic glass, given its hard, glassy appearance by sudden cooling. Obsidian consists of silicate of alumina, with iron and lime or potash or soda, according to the species of feldspar involved. In Mexico and Peru cutting weapons and rings were manufactured out of it by the natives. The largest known mass of obsidian is Obsidian Cliff, in Yellowstone National Park.

Ocarina, *ok a re'nah*, a musical wind instrument, of clay, clumsy in shape and pierced with



OCARINA

a number of small finger holes. It gives a sweet tone.

Ocean, *o'shan*, or **Sea**, the vast body of water which covers nearly three-fourths of the surface of the globe. Although no portion of it is completely detached from the rest, the ocean has been theoretically divided into several great basins or areas, namely, the Pacific Ocean, which separates Asia and Australia from America; the Atlantic Ocean, which separates America from Europe and Africa; the Indian Ocean, which intervenes between Africa and Australia; the Arctic and the Antarctic oceans, round the north and south poles, respectively. Between these divisions no very definite limits can be drawn; thus it is impossible to say where the

Ocean Grove

Atlantic or the Pacific ends and the Antarctic or Southern Ocean begins.

The bed of the ocean appears to present the same irregularities as the surface of the land, being diversified by rocks, mountains, plains and deep valleys. The deepest soundings at present known are 5500 fathoms (33,000 feet), near the Fiji Islands; 4561 fathoms (27,366 feet), near the north coast of Porto Rico (See ATLANTIC OCEAN; PACIFIC OCEAN). No depth exceeding 4000 fathoms (24,000 feet) has been found in the Indian Ocean.

The waters of the ocean vary as greatly in temperature as they do in depth. This is partly due to the ordinary effects of separation; but the abrupt changes and irregular distribution of temperature are chiefly owing to currents (See CURRENTS, MARINE). The Pacific and Indian oceans are both warmer in low latitudes than the Atlantic, and the mean temperature of the equatorial areas at the surface is about 81.5°; the temperature of the North Atlantic is due to the influence of the Gulf Stream. This high temperature applies only to the surface water of the ocean, for experience shows that in both hemispheres and in all latitudes the water near the bottom of the ocean is exceedingly cold. In low latitudes, water at 32° has been drawn from great depths; while in high latitudes water at 26° has been found. This is accounted for by the supposition that the cold water at the poles, by reason of its specific gravity, sinks to the bottom and spreads throughout the ocean basin. The saltness of the ocean is due to the presence of various ingredients, chiefly common salt, which are generally found in the proportion of from 30 to 40 parts to one thousand. Recent observations have shown that the color and transparency of the water of the ocean are in a large measure dependent on the degree of saltiness. In general, it is found that the greater the saltiness the greater the transparency, and also that where the saltiness is very great the water is of a dark blue color, that where it is less the water is of a lighter blue, inclining to green, and that in the neighborhood of rivers, where the saltiness is reduced to a minimum, the water is, as a rule, of a greenish yellow.

Ocean Grove, N. J., a town in Monmouth co., on the Atlantic Ocean, s. of New York City, about 30 mi. by water and 50 mi. by rail, and on the Pennsylvania and the Central of New Jersey railroads. It is a very popular summer resort, controlled by the Ocean Grove Camp Meeting Association of the Methodist Episcopal

Church. Theatrical performances and the sale of tobacco and intoxicating liquors are prohibited, and strict Sunday laws are rigidly enforced. The prominent buildings are the post-office, the township high school and the Auditorium, seating 10,000 people, where the religious services are held. There are many hotels, boarding houses and summer cottages. Asbury Park is just to the north, separated from Ocean Grove by Wesley Lake. The association was organized in 1869, and the first building was erected in 1875. Population in 1910, 1600, and in summer, 25,000 or more.

Oceania, *o she an' i a*, or **Oceanica**, a term used by some geographers to include all the islands of the Pacific between Asia on the northwest, the Indian Ocean on the west, the Antarctic Ocean on the south and America on the north and east. The term *Australasia* is also applied to the same area, including Australia.

Ocelot, *o'se lot*, an animal of the cat family, found in America, from Texas south to Pata-



OCELOT

gonia. It is about three feet in length and is of a tawny or gray color on the back and sides and white on the under part of the body. Its coat is beautifully marked with black spots and bars. The ocelot inhabits forests and lives mainly on birds and mice and other small animals. It is killed for its beautiful skin. The ocelot is also called the panther cat.

Ochre, *o'kur*, a combination of peroxide of iron with water. The name is, however, generally applied to clays colored with the oxides of iron in various proportions. Considerable quantities of ochre are obtained from the mud separated from tin and copper ores, since it contains more or less iron; and it is also found in natural beds some feet thick in the more recent formations. Ochres vary in color from a pale sandy yellow to a brownish red and are much used in the manufacture of paints.

O'Connell, DANIEL (1775-1847), an Irish patriot and agitator, born in County Kerry. He was educated at a school in Cork and at the Catholic colleges of Saint Omer and Douai, in

France. He was admitted to the Irish bar and soon became distinguished for legal skill and oratory. Turning his energy to politics, he advocated Catholic emancipation and skilfully kept the agitation within constitutional lines. He was elected to Parliament for County Clare in 1828, but was not allowed to take his seat because he was a Catholic and as such could not take the oath required by the Test Act. In the following year, however, he attained his triumph, when the government of the Duke of Wellington granted the Catholic claims. Again he was returned to Parliament, of which he was a member for the remainder of his life. In 1841 he called together enormous meetings throughout Ireland and raised a cry for the repeal of the union. This agitation Peel and the government determined to put down. They arrested O'Connell, obtained a conviction and sentenced him to twelve months' imprisonment, with a large fine. In a few months the House of Lords reversed this judgment. O'Connell made his last speech in Parliament in April, 1847, and died the following month.

O'Connell, WILLIAM H. (1859-), an American Roman Catholic cardinal, born in Lowell, Massachusetts, educated in Boston College and in Rome, in which place he was ordained



CARDINAL O'CONNELL

in 1884. For ten years his field of work was Boston and vicinity. In 1896 he became rector of the American College at Rome, and in 1901 was consecrated bishop of Portland. Four years later he was commissioned by the pope as ambassador to the mikado of Japan on a missionary project. So successful was he that upon his re-

turn in 1906 he was made coadjutor archbishop of Boston and the following year became archbishop of New England. On November 27, 1911, Archbishop O'Connell, together with Archbishops Farley and Falconio, were named as cardinals of the church.

O'Con'nor, THOMAS POWER (1848—), an Irish journalist and politician, born at Athlone, in the County of Roscond, Ireland. Early in life he entered journalism and was employed on several Dublin and London papers. In 1880 he entered Parliament as member for Galway, becoming conspicuous as a member of the radical Irish independence party. The following year he lectured in America, devoting himself to the agitation of the Irish question. In 1883, O'Connor was elected president of the Irish National League of Great Britain and since 1885 has been member for Liverpool. He was the founder and editor of several daily and weekly journals.

O'Con'or, CHARLES (1804-1884), an American lawyer and politician, born in New York City. Admitted to the bar in 1824, he soon gained a wide reputation as one of the most brilliant lawyers in the East and as a prominent supporter of the Irish nationalist movement in America. During the Civil War his sympathies were with the South, and he took an active interest in securing legal justice for the leaders of the Confederate cause, signing, with Horace Greeley, the bail bond of Jefferson Davis and voluntarily appearing as his counsel. He was conspicuous in the prosecution of the Tweed Ring and in 1872 was nominated, in spite of his positive refusal, for president of the United States, by the portion of the Democratic party which declined to support Horace Greeley.

Ocon'to, Wis., the county-seat of Oconto co., 30 mi. n. of the city of Green Bay, on Green Bay, at the mouth of the Oconto River, and on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. The city is the business center for a large lumbering region and has a considerable trade in lumber and fish. There are lumber mills, flour mills, a canning factory, a brewery and other works. The city has a public library, a fine courthouse and a high school building. It was settled in 1850 and was incorporated in 1882. Population in 1910, 5629.

Oc'tave. See MUSIC.

Octa'via, sister to the emperor Augustus, was the widow of Claudius Marcellus, when she was married, at the instance of her brother, to the triumvir, Mark Antony. Antony neglected her for Cleopatra, queen of Egypt, but notwith-

standing this, Octavia displayed the most noble fidelity to his house and fortunes and devoted herself to the education of his children. At length he divorced her and ordered her to leave his house, a command she obeyed without complaint. She died in 11 B. C.

Octa'vius or **Octavianus**. See AUGUSTUS.

Octo'ber, the tenth month of the year, containing thirty-one days. It was the eighth month of the Roman year, and from that fact it takes its name.

Octopus, a genus of mollusks, commonly known as cuttlefishes, one of the cephalopods.



OCTOPUS

They have eight arms, each with two rows of suckers. The prominent head is joined to the body by a distinct neck, and the body is short, generally more or less rounded in shape, and unprovided with side or lateral fins. They have attained great notoriety from the stories told of their exceeding ferocity and of the existence of gigantic members of the genus, though the largest cuttlefishes found have not belonged to this eight-armed genus.

Odd Fellows, INDEPENDENT ORDER OF, a large friendly society, or fraternal order, whose headquarters were originally in Manchester, England. It assumed its present form at a convention in Manchester in 1813 and has spread widely in Great Britain and elsewhere. The organization was introduced into the United States in 1819 and severed its connection with the British Union in 1843. Branch societies connected with England or the United States have been founded in Canada, Australia, New

Zealand, South Africa and South America. There is a branch of the order for women, known as the Rebekah degree. The total number of Odd Fellows in the United States and Canada is 1,437,235.

Ode, a poem of a lyrical nature, differing from the song by its more dignified character and by the fact that it is usually addressed directly to some person or thing. The Greeks called every lyrical poem adapted to singing, an ode. The principal ancient writers who employed this form of verse were Pindar, Anacreon, Sappho, Alcaeus, among the Greeks, and Horace, among the Romans. As employed by English writers the ode takes either the Pindaric form of strophe, antistrophe and epode, irregularly arranged and contrasted; or, as in its later development, the form of a regular series of regular stanzas. The former style is found in Dryden's *Ode for Saint Cecilia's Day*, while the latter is seen in Shelley's *Ode to a Skylark*. The English poets who have carried the ode to its highest point of perfection are Milton, Dryden, Collins, Grey, Coleridge, Wordsworth, Keats and Shelley; among the greatest odes in English, besides the two mentioned above, are Wordsworth's *To Duty* and *Intimations of Immortality*; Shelley's *To the West Wind* and *To Liberty*; Keats's *To a Nightingale* and *On a Grecian Urn*; Tennyson's *On the Death of the Duke of Wellington*; Burns's *To a Mouse* and *To a Mountain Daisy*; Bryant's *To a Waterfowl* and Lowell's *Commemoration Ode*.

Odense, *o'den sa*, a seaport town of Denmark, capital of the island of Funen, on the Odense River, near the fiord of the same name. It is a well-built town and has a magnificent cathedral of the thirteenth century and several other notable buildings. Its manufacturing industries, among which are brewing, distilling, glassmaking, sugar refining and the manufacture of machines and textiles, are of great importance. It was the birthplace of Hans Christian Andersen. Population, 40,138.

O'der, a river of Germany which rises in the Odegebirge, flows n., then n. w., and after passing through the Stettiner Haft, empties into the Baltic by three branches. Its length is about 550 miles. The traffic of the river is very important, and the principal towns on its banks are Stettin, Frankfort-on-the-Oder, Breslau and Oppeln. Its chief tributary is the Warthe.

Odes'sa, a Russian seaport in the Government of Kherson, on the Black Sea, e. of the

mouth of the Dnieper. It is a well-built city, with broad streets, the most beautiful of which is the Nikolayevsky Boulevard, and a number of noteworthy buildings. The Imperial New Russian University, with almost 2000 students, is located at Odessa, which possesses also a municipal library of about 150,000 volumes. The roadstead is large and deep, but it is dangerously exposed to easterly winds. The shipping, however, is protected in three large harbors, enclosed by moles. Odessa is the greatest shipping point in Russia and is one of the chief wheat ports in the East, while wool, timber, hemp, flax, iron and coal are among the staple exports. A large overland trade is also carried on with Germany, Austria, France, Switzerland and Italy, and there are manufactures of matches, sugar, soap, textiles, leather and chemicals. The city was founded by Catharine II in 1792. Population in 1911, 505,600.

O'din or **Wo'den**, the chief god of Northern mythology, the omniscient ruler of heaven and



ODIN

From an old manuscript.

earth, from whom all the other gods were descended. In Asgard, the home of the gods, he occupied the highest throne, from which he could see over the whole universe. Two ravens sat upon his shoulders, and these he was wont to send throughout the earth to bring him tidings of everything that took place. As a war god he held his court in Valhalla, where brave warriors were carried after death on the battlefield, to enjoy an eternal life of feasting and fighting. In art, Odin is represented as a powerful man of about fifty, usually clad in a

long cloak of blue and gray, representing the sky with its clouds. Wednesday received its name from Woden.

Odoacer, *o do a'sur*, (?-493), the first barbarian king or ruler of Italy after the fall of the Western Empire. He was of German origin, the son of Idico, and received his early training in the camp of Attila, king of the Huns. He afterward journeyed into Italy and joined the imperial guard of the Roman army. He was chosen head of the barbarian confederates, and, having overthrown Romulus Augustulus, the last of the Roman emperors, he assumed the title of king in 476. Out of policy he paid court to the Byzantine emperor Zeno, from whom he received the title of patrician. He ruled with vigor and wisdom. In 489 Italy was invaded by the Ostrogoths under Theodoric; Odoacer was defeated in three battles, and on the fall of Ravenna he was assassinated.

Odysseus, *o dis'use*. See ULYSSES.

Odyssey, an ancient Greek epic, ascribed to Homer, in which are described the wanderings of Ulysses (called Odysseus by the Greeks) in his return from the Trojan War. At the beginning of his voyage he was wrecked on the coast of Thrace, and in plundering the town of Ismarus he lost many of his followers. Next he was driven to the coast of Libya and thence northward to the goat island. With one ship he sailed to the island of the Cyclops, on the west coast of Sicily. With twelve companions, he entered the cave of the one-eyed monster, Polyphemus, who devoured six of the intruders. Ulysses made Polyphemus drunk with wine, blinded him with a burning pole and escaped with his comrades. Henceforth he was pursued by the wrath of Neptune, whose son the Cyclops was. After losing all his ships but one, he reached an island where dwelt the sorceress Circe, who counseled him to make a journey to Hades. When he left Circe's island he sailed by the island of the Sirens, and after successfully passing Scylla and Charybdis, he reached Thrinacia, the island of Helios. Here his companions killed some sacred oxen, and, consequently, on their next voyage they were all shipwrecked and drowned except Ulysses, who escaped to the island where lived the nymph Calypso, and where he remained eight years. Leaving the island on a raft he was again wrecked, but reached the island of the Phaeacians. The princess Nausicaa and her maidens discovered him, and he was kindly received and cared for by King Alcinous. After

a happy sojourn he was sent to Ithaca, and, after slaying the suitors of his wife Penelope, he was gladly welcomed by her and all his subjects. See HOMER, and the names of the principal characters mentioned above.

Oedipus, *ed'i pus*, in ancient Greek legend, son of Laius, king of Thebes. An oracle had foretold that the child should grow up to kill his father, marry his mother and bring destruction upon his city; to prevent this, Laius had the child exposed to die. He was found, however, and given into the care of the king of Corinth, at whose court he grew up. Learning, when he reached manhood, of the fate which was before him, and believing that the king and queen of Corinth were meant in the prophecy, he left the city and wandered off to Thebes. While on the way, he accidentally encountered Laius, whom, in a sudden brawl he put to death, unconscious, of course, of his identity. He then entered into Thebes, and, having guessed the riddle of the sphinx, he was made king of that city and given, as a wife, the queen, Jocasta. In spite of this fulfillment of the ancient prophecy, Oedipus was for some time very fortunate and happy. Gradually, however, he became aware of the terrible circumstances of his life, which he had not understood before, and in despair he put out his eyes and wandered forth from his city as an outcast. He was faithfully attended by his daughter Antigone. At Colonus he bade farewell to his daughter and entered a dark forest, from which he never afterward emerged. It was believed that he had been carried away by the Furies. Two plays of Sophocles, *Oedipus Coloneus* and *Oedipus Tyrannus*, give part of the story of this unfortunate king. See SPHINX.

Oelwein, *ole'wine*, IOWA, a city of Fayette co., 65 mi. w. by n. of Dubuque, on the Rock Island and several lines of the Chicago Great Western railroad. It is in an agricultural region and contains large railroad repair shops, a foundry and other establishments. It was settled in 1875 by August Oelwein, was incorporated in 1888 and was chartered as a city in 1897. There are nine churches, three banks and a business college. Population in 1910, 6028.

Oeta, *e'tah*, a mountain mass in Greece, forming the southern boundary of Thessaly and separating that country from central Greece. At the eastern extremity is the pass of Thermopylae.

Offenbach, *of'jen baK*, a town of Germany, in the grand duchy of Hesse, 4 mi. e. of Frank-

fort. It is an important commercial and manufacturing center, its manufactures embracing various chemical products, metal goods, leather and leather goods, paper, soap, jewelry and carpets. Population in 1900, 50,468.

Offenbach, JACQUES (1819-1880), a French composer, born of Jewish parents at Cologne. He entered the Paris Conservatoire in 1835, became proficient on the violoncello and for some time played on this instrument in the orchestra of the Théâtre Comique. In 1847 he became conductor of the Théâtre Français and subsequently earned the reputation of being the greatest of all writers of light opera, through his *La Barbe Bleue*, *Vert-vert*, *La Princesse de Trebizonde* and *Les Contes d'Hoffmann*.

Og, king of Bashan, at the time of the conquest of Canaan by the Israelites. He and his people were destroyed.

Og'den, UTAH, the county-seat of Weber co., 35 mi. n. of Salt Lake City and 10 mi. e. of Salt Lake, on the Weber River, at the mouth of the Ogden, and on the Southern Pacific, the Union Pacific, the Oregon Short Line and other railroads. The city is in a fertile agricultural and fruit-growing section, near the picturesque Ogden Canyon. The falls in the river have been utilized in the development of electrical power, which is used in Ogden, Salt Lake City and other places. The principal industrial establishments are canneries, flour mills, a tin can factory, a beet sugar factory, a large brewery, brickyards and sewer pipe works. An irrigating canal has been constructed, which supplies water to about 150,000 acres of land in the surrounding country, adapted to the raising of fine fruits and berries. The city contains the Weber Stake Academy, Sacred Heart Academy, a state industrial school, and state institutions for the deaf, dumb and blind. There are gas and electric lights and electric street railways. The important buildings include a fine union depot, five banks, a number of wholesale houses and about fifteen hotels. The place was settled about 1848, was laid out under the direction of Brigham Young in 1850 and was chartered as a city in the next year. Population in 1910, 25,580.

Og'densburg, N. Y., a city in Saint Lawrence co., 170 mi. n. w. of Albany, on the Saint Lawrence River, at the mouth of the Oswegatchie River and opposite Prescott, Ont., and on the New York Central and the Rutland railroads. It has a large Canadian trade in grain, lumber, coal and manufactured goods. Water power from the river is utilized, and there

are shipbuilding yards, lumber mills and manufactures of silk, flour, gloves and other articles. The city contains five parks, the Ogdensburg Free Academy, a state hospital for the insane, the city and the Saint John's hospitals, an orphanage, a home for the aged and other institutions. The other prominent structures include the fine Federal building, a state armory, the city hall, a public library and a Roman Catholic cathedral. The place was settled in 1749 and was chartered as a city in 1868. Population in 1910, 15,933.

O'glesby, RICHARD JAMES (1824-1899), an American statesman and soldier, born in Kentucky. He began life as a carpenter, later studied law and was admitted to the bar of Illinois in 1845. He took an active part in the Mexican War, afterward resumed his law practice and went to California in 1849. He returned two years later. In 1860 he was elected state senator, but preferred to join the Union forces in the Civil War. He was made brigadier general and later major general of volunteers and fought at forts Henry and Donelson, Shiloh and Corinth. In 1864 he was elected governor of Illinois and was reelected in 1872. He served in the United States Senate from 1873 to 1879 and was again elected governor in 1885.

O'glethorpe, JAMES EDWARD (about 1696-1785), an English soldier, reformer and colonist,



JAMES E. OGLETHORPE
From an old drawing.

founder of the State of Georgia. He was born at London, entered the army, became a member

of Parliament in 1822 and headed a commission to investigate imprisonment for debt. The disclosures led Oglethorpe to form a scheme of colonization for the benefit of debtors, and in 1732 he secured a patent to lands in America in the present State of Georgia. He became governor of the new colony and founded the city of Savannah in 1733. During his career in the colony, he displayed exceptional energy, liberality and executive ability and conducted several notable military exploits against the Indians and Spanish in Florida. He returned to England in 1743, became a brigadier general and took a prominent part in politics until his death.

Ogowai, *o go way'*, or **Ogove**, *o go vay'*, a river of Africa, the course of which lies chiefly in French Kongo. Its commercial importance is not very great, as its course is much broken by rapids. A number of European trading stations have been established on its banks. Its total length is 700 miles.

Oh'i'o, the **BUCKEYE STATE**, situated in the northeast part of the central belt of states. It is bounded on the north by Michigan and Lake Erie, on the east by Pennsylvania, on the east and south by the Ohio River, which separates it from West Virginia and Kentucky, and on the west by Indiana. The international boundary passes through Lake Erie, about midway between the northern and southern shores. The greatest length from east to west is 225 miles; the greatest breadth from north to south is 210 miles and the total area is 41,040 square miles. The lake shore has a length of 230 miles, and the Ohio River along the southern boundary, a length of 436 miles. Lying in Lake Erie between Maumee and Sandusky bays are a number of islands, several of which belong to Ohio. Population in 1910, 4,767,121.

SURFACE AND DRAINAGE. The eastern part of the state belongs to the Appalachian plateau, and the western part belongs to the prairie region. In general, the surface is rolling and contains no mountains, though a few of the highest hills are designated as mountains by the inhabitants of the locality. A height of land, which is a low, flat ridge, extends in an irregular direction across the state, from near the northeastern corner to a point a little north of the middle of the western boundary, and separates the state into two drainage districts, the northern sloping toward Lake Erie and the southern toward the Ohio. To the north of this height of land the surface is more generally level and

has a gentle slope toward the lake. The portion to the south is much the larger, and this is deeply cut by streams flowing through it to the Ohio. It is more generally rolling than the northern portion and contains the highest point of land within the state, which is near Bellefontaine, a little west of the center, and has an altitude of 1540 feet. Some of the bluffs along the Ohio have an altitude of 600 feet, or more.

The chief rivers flowing into Lake Erie are the Maumee, in the northwestern section of the state, the Sandusky, the Cuyahoga and the Grand, which is in the northeastern corner. The rivers flowing into the Ohio are longer and larger than those flowing into Lake Erie. From the west eastward these are, in their order, the Great Miami, the Little Miami, the White, the Scioto, the Hocking and the Muskingum.

The Muskingum is the longest river lying wholly within the state, and is navigable for 100 miles. Many of the streams are rapid and furnish water power, which is a great aid to the development of manufactures. The rivers flowing into Lake Erie form estuaries at their mouths, which have been converted into excellent harbors in the case of the Maumee and Cuyahoga.

CLIMATE. The climate is generally healthful, though sudden changes in temperature are frequent and extreme. The constantly varying winds, however, greatly lessen the duration of the extremes. In the north the winters are cold, but they are moderated near the lake shore by the milder temperature of the water; the summers and autumns are temperate and pleasant. In the southern portion the winters are comparatively short and mild, and the snowfall is not heavy; the summers are long and hot. The mean annual temperature in the state is about 51°, and the annual rainfall, about 38 inches.

MINERAL RESOURCES. The southeastern part of the state contains coal measures which have an average thickness of 15 feet and an area of 1200 square miles. The coal found is of the bituminous variety and is of excellent quality, and large quantities are mined each year, making Ohio one of the important coal-producing states. Clay suitable for making brick and pottery is widely distributed and gives rise to many important industries. Along the Ohio are a number of large establishments given to the manufacture of pottery, so that the state ranks first in the Union in this industry. Petroleum is found in the southeastern part of the state and also in the northwestern section. The first field is known as the "Eastern," and the

second is called the "Lima". The annual production from these fields is about 22,400,000 barrels, placing Ohio first among the oil-producing states. Natural gas is also found in and near the oil fields and has been extensively used, but the supply is diminishing, and some industries which located in this region because of the supply of fuel have moved elsewhere. In the northern part of the state are large quarries of stone suitable for the manufacture of whetstones and grindstones. Granite, limestone, sandstone and other building material are generally distributed over the state.

AGRICULTURE. With the exception of a small area in the southeastern corner of the state, the soil is fertile and well suited to general agriculture. The region sloping toward Lake Erie contains considerable clay that is well adapted to growing wheat. The bottom lands along the rivers are especially suited to corn, while fruits, vegetables, barley, oats, rye and potatoes are generally grown throughout the state. There are large areas suited to grazing, and dairying and the raising of live stock are important branches of industry.

MANUFACTURES. In the value of manufactures, Ohio ranks fifth in the United States. In the manufacture of iron and steel products, Ohio is second to Pennsylvania only. Allied to, and next in importance to, the manufacture of iron and steel is the manufacture of foundry and machine-shop products, of which Cleveland and Cincinnati are the great centers. The industry which ranks third in the state, and in which Ohio ranks fifth among the states, is flour and grist milling. Of the other leading industries, the production of malt and distilled liquors and of wine from Catawba grapes, the manufacture of lumber and timber products and slaughtering and meat packing are most notable. In the manufacture of stone and earthen ware, Ohio ranks first among the states and produces more than one-fourth of the product of the country.

TRANSPORTATION. The high degree of development of the manufacturing industries is largely due to the unusually excellent means of water transportation. Ready communication is possible with the Atlantic coast by means of Lake Erie and the Erie Canal; with the states of the northwest through the Great Lakes, and with the Mississippi Valley by means of the Ohio River. Canals extend across the state from Toledo to Cincinnati and from Cleveland, *via* Columbus, to Portsmouth. Besides this

system of lakes, rivers and canals; there is a vast system of trunk and local lines of railway in Ohio. Notable among the trunk lines are the Baltimore & Ohio; the Cleveland, Cincinnati, Chicago & Saint Louis; the Erie; the Lake Shore & Michigan Southern; the Toledo and Ohio Central; the Pennsylvania, and the Wabash. The railway mileage is about 9200 miles.

GOVERNMENT. The legislature consists of a senate and house of representatives, the members for each house being apportioned according to population and elected for two years. The legislature meets biennially, and the sessions are unlimited. The executive department consists of the governor, the lieutenant governor, the secretary of state, the treasurer, the attorney-general and the school commissioner, elected for two years, and an auditor elected for four years. The courts consist of a supreme court, circuit courts and courts of common pleas. Each county has a probate court, and justice and other inferior courts are established in towns and cities. The judges are elected by popular vote.

EDUCATION. Somewhat more than \$25,000,000 is annually expended for public instruction in Ohio, and the state ranks high for its public school system. The state institutions of higher learning are Miami University at Oxford, Ohio University at Athens, the State University at Columbus and Wilberforce University at Wilberforce. Among the oldest and most prominent private colleges and universities are Marietta College at Marietta, Oberlin College at Oberlin, Ohio Wesleyan University at Delaware, Saint Xavier's at Cincinnati, Western Reserve University at Cleveland, Denison University at Granville, Hiram College at Hiram, University of Wooster at Wooster, Wittenberg College at Springfield, Otterbein University at Westerville, Kenyon College at Gambier, Heidelberg University at Tiffin and Buchtel College at Akron. Of those more recently founded, the University of Cincinnati and the Case School of Applied Science at Cleveland are notable.

INSTITUTIONS. The schools for the blind, the deaf and dumb and the feeble-minded are at Columbus. There are also an industrial home for girls and an industrial school for boys. The hospitals for the insane are at Athens, Cleveland, Columbus, Dayton, Longview and Toledo. The soldiers' home is at Dayton, the soldiers' and sailors' home at Sandusky; the state penitentiary is at Columbus, and the state reformatory is at Mansfield.

Ohio River

CITIES. The chief cities are Columbus, the capital; Cleveland, Cincinnati, Toledo, Dayton, Youngstown, Akron, Springfield, Canton, Zanesville and Sandusky, each of which is described under its title.

HISTORY. Ohio was probably discovered by La Salle, as early as 1670, and the French took formal possession of the whole Northwest in the following year. A few years later conflicting claims arose between the French and the English regarding this territory, which were set at rest by the Treaty of Paris in 1763, by which France surrendered to Great Britain all her lands in the North and West as far as the Mississippi. In 1787 the Ohio Company was organized in New England by soldiers who had served in the War of the Revolution, of whom Manasseh Cutler and Rufus Putnam were conspicuous, and under their auspices a large tract of land was purchased from the government in the territory northwest of the Ohio River. This was the first public sale of land by the United States government. In connection with its sale, the famous Ordinance of 1787 was passed (See ORDINANCE OF 1787).

In 1788 Marietta and Cincinnati were founded, and settlements in the southern part of the territory increased rapidly. Late in 1794 a victory was gained by Gen. Anthony Wayne over the Indians, at "Fallen Timbers" on the Maumee River, and the next year a treaty of peace was concluded, the Indians ceding a great portion of the territory, which settlers began at once to fill. Chillicothe was made the seat of government for the territory; the legislature first met in 1799 and sent W. H. Harrison as delegate to Congress. Indiana was set off from Ohio in 1800, and in 1802 a constitution was adopted for the latter. On Feb. 19, 1803, Ohio was admitted into the Union. Ohio took an active part in the War of 1812. In the Civil War, the state supplied many times its quota of troops to the Federal army, although there was a strong Southern sentiment in many parts of the state. Because of the many waterways leading to Ohio and its varied natural resources, the course of western immigration set toward the state and built it up rapidly. Consult Rufus King's *Ohio*, in the American Commonwealths Series.

Ohio River, a river formed at Pittsburg, Pa., by the confluence of the Allegheny, from the n., and the Monongahela, from the s. At its formation it is a navigable stream 600 yards wide. It flows first northwest, then southwest, separating Ohio from West Virginia, and in its further course it separates Kentucky on the

Oil City

south from Ohio, Indiana and Illinois. It enters the Mississippi at Cairo, Ill., after a course of almost 1000 miles. Its drainage basin is estimated at about 210,000 square miles. The river is navigable from Pittsburg to Cairo except in the extreme dry season and in the coldest winter weather. The principal tributaries are the Muskingum, the Miami, the Wabash, the Great Kanawha, the Big Sandy, the Licking, the Green, the Cumberland and the Tennessee rivers. Among the towns on its banks are Pittsburg, Pa., Wheeling, W. Va., Marietta, Ohio, Covington, Ky., Cincinnati, Ohio, Madison, Ind., Louisville, Ky., Evansville, Ind., Paducah, Ky., and Cairo, Ill.

Ohio State University, THE, a state institution of higher learning at Columbus, Ohio, founded in 1870 as the Ohio Agricultural and Mechanical College. It was given its present name in 1878. The university comprises six colleges, namely, agriculture and domestic science; arts, philosophy and science; engineering; law; pharmacy, and veterinary medicine. It has a faculty of about 270, an attendance of nearly 4000 and a library containing over 120,000 volumes.

Ohm, ome. Every conductor offers a certain degree of resistance to the flow of the electric current, in much the same way as the size and friction of a pipe resist the flow of water through it. The ohm is the unit employed in measuring electrical resistance. It is equivalent to the resistance offered by a column of mercury whose mass is 14.4521 grams, whose cross section is one square millimeter and whose length is 106.3 centimeters, at the temperature of melting ice. In common terms, this means a column of mercury the size of that found in an ordinary thermometer tube 40.84 inches long, at a temperature of 32° F.

Ohm, GEORG SIMON (1787-1854), a German physicist. He became successively professor of physics at Cologne, director of the Polytechnic at Nuremberg and professor of physics at the University of Munich. He was the discoverer of what is known as "Ohm's Law" in electricity, and he wrote important scientific works.

Ohm's Law, an important law in electricity, deduced by Professor Ohm, to the effect that the intensity of the electric current is directly proportional to the whole electromotive force in operation and is inversely proportional to the sum of the resistances in the circuit. See ELECTRO-MOTIVE FORCE.

Oil City, PA., a city in Venango co., 132 mi. n. of Pittsburg, on the Allegheny River, at the

mouth of Oil Creek, and on the Lake Shore & Michigan Southern, the Pennsylvania and the Erie railroads. It is the center of the great oil region of western Pennsylvania and has large refineries, barrel works, foundries, machine shops and manufactures of boilers, engines, oil well supplies and other articles. The principal buildings include a Carnegie library, a city hospital, a high school and the Oil Exchange. The place was settled about 1825, became prominent with the development of the oil fields after 1859 and was chartered as a city in 1874. On the fifth of June, 1892, burning oil swept down the creek from Titusville and destroyed over one hundred lives and more than a million dollars' worth of property. Population in 1910, 15,657.

Oilcloth, a floor covering made of coarse canvas, filled with a thick oil paint and coated on both sides. The canvas is sized by drawing it through a mixture of glue, rye flour, tobacco or varnish, after which it is dried, rubbed down with pumice stone and painted. After painting, the ornamental design is placed upon the surface. Oilcloths are made in varying widths and in a number of grades. The more durable grades make a very desirable floor covering for offices and rooms where the floors need to be cleaned by washing. See **LINOLEUM**.

Oil Palm, one of several species of African palms, closely resembling the cocoanut palm. They yield a palm oil. See **PALM OIL**.

Oils, sticky or viscid substances formed within living animal or vegetable organisms, liquid at ordinary temperatures, insoluble in, and lighter than, water, taking fire when heated in air and burning with a more or less luminous flame. The oils are usually divided into the fat, or fixed, oils, and the volatile, or essential, oils. Another division recognizes vegetable oils, by far the most numerous, animal oils and the mineral oils (petroleum, naphtha).

Fat, or fixed, oils are subdivided into the *drying* and the *non-drying* oils. The former class includes all oils which, through the absorption of oxygen, thicken when exposed to the air and are converted thereby into varnish, as, for example, linseed and hemp-seed oil. The most important of the drying oils are linseed, hemp, walnut, poppy, candle nut, sesame, sunflower, madia and safflower. All the drying oils are of vegetable origin. The *non-drying* oils (partly of vegetable, partly of animal origin) when exposed to the air also undergo a change, resulting in the formation of acrid, disagreeably smelling sub-

stances, which, though they thicken, do not become dry. The fixed vegetable oils are generally prepared by subjecting the seeds of the plant to pressure, with or without heat, but they may also be extracted by means of certain solvents. Of the non-drying oils the chief are olive, cottonseed, colza, rape, ground nut, castor and croton.

Volatile oils are generally obtained by distilling with water the plants which afford them. They are acrid, caustic, aromatic and limpid and are mostly soluble in alcohol, forming essences. They boil at a temperature considerably above that of boiling water, some of them undergoing partial decomposition. A few of them are hydrocarbons; the greater number, however, contain oxygen as one of their elements. They are chiefly used in medicine and in the manufacture of perfumery; and a few of them are extensively employed in the arts, as vehicles for colors, and in the manufacture of varnishes, especially oil of turpentine. They are very numerous, among them being the oils of anise, bergamot, clove, cinnamon, cajeput, lavender, lemon, lime, orange, mint, peppermint, nutmeg, marjoram, rosemary and thyme.

Animal oils are, for the most part, the fluid parts of the fat of the animal and are separated by heat alone. The animal oils comprise neat's foot oil, train oil, seal oil, sperm oil, porpoise oil, cod-liver oil and shark oil. Many are used as articles of food, some are medicines and some are used extensively in the arts. *Vegetable fixed oils* all consist of one or more peculiar principles. Thus, olive oil contains chiefly olein, with a little stearin; linseed oil is composed mainly of linolein. A certain number of the vegetable oils are also known as vegetable fats, from their consistency at ordinary temperatures, such as palm oil, cocoanut oil, shea-butter.

Ojib'wa or **Chip'pewa**, a once important tribe of indians, distributed in bands round both sides of the basin of Lake Superior, where they owned vast tracts. They were of the Algonquian stock, tall, active and well formed, and subsisted chiefly by hunting and fishing. They now number about 30,000.

Okapi, *o kah'pe*, a giraffe-like animal, which was found for the first time in 1899, in the forests of the Kongo valley. It is about four feet tall at the shoulders, has a shorter, thicker neck than the giraffe and is without horns. The body, neck and forehead range from black to sepia brown. The nose is sepia, and the cheeks and jaws are of a yellowish white. The animal lives

in the midst of dense forests, where it is hunted by the dwarfs.

O'keecho'bee Lake, a large, shallow lake in southern Florida. It is about 40 miles in length by 25 in breadth and has a maximum depth of 12 feet. Its waters are discharged through the Everglades, but there is no appreciable outlet stream. It contains a few low islands.

Okhotsk, *o kotsk'*, SEA OF, an inlet of the North Pacific Ocean, bounded on the n. by Russian Siberia, on the e. by Kamtchatka, and partly enclosed by the Kurile Islands on the south. The coasts are only thinly inhabited.

O'klaho'ma, the BOOMER STATE, situated in the south central part of the United States, bounded on the n. by Colorado and Kansas, on the e. by Missouri and Arkansas, on the s. by Texas and on the w. by Texas and New Mexico. The length from east to west is about 310 miles; the length of the eastern boundary is 213 miles and the western boundary is 170 miles. The area is 70,057 sq. mi., of which 643 sq. mi. are water. The dimensions of length and breadth here given do not take into account the western prolongation of the state, generally known as "No Man's Land," and now constituting Cimarron, Texas and Beaver counties.

SURFACE AND DRAINAGE. The northeastern part of the state north of the Arkansas and Canadian rivers is a plateau deeply cut by the streams which flow across it. In the central part of this plateau, those portions occupied by the Cherokee and Creek nations, there is considerable open prairie country. The southeastern part of the state, south of the Canadian River, is broken by hills, which enter it from Arkansas. These vary in altitude from 2500 feet, on the Arkansas border, to about 1000 feet, in the south central part of the state. The hills and intervening valleys of this section are quite heavily wooded. From the central part of the state westward, the surface consists almost wholly of a rolling plateau, rising from an altitude of 800 feet, in the center of the state, to 2500 feet, on the northwestern boundary, and 5000 feet, in the extreme western part of Beaver County. The western part of the state properly belongs to the region of the great plains.

Oklahoma is watered by the Arkansas River, which flows across the northeastern portion, and its leading tributaries, chief of these being the Canadian, which enters the state near the middle of its western boundary and flows easterly, uniting with the Arkansas a few miles west of the eastern boundary. The North Fork of the

Beaver River from "No Man's Land," and Wolf Creek from Texas unite to form the Canadian, which flows in an easterly-southeasterly direction until it unites with the main stream a few miles west of its confluence with the Arkansas. North of the North Fork is the Cimarron, flowing nearly parallel with it, and in the northeastern corner are the Verdigris and Neosho rivers, flowing southerly into the Arkansas. The most important stream in the southern part of the state is the Washita, which unites with the Red a little east of the midway point of the southern boundary. The Red River and its minor tributaries drain the southern part of the state, and this stream forms most of the boundary between Oklahoma and Texas. There are no lakes of importance.

CLIMATE. The climate is warm temperate, but in general it is mild, both summer and winter, though in the midst of the summer, periods of extreme heat occur, during which the thermometer has been known to rise as high as 115°. Severe cold is seldom known. The winters are mild and salubrious. In general the mean temperature for July is about 81°, and for the entire year, about 60°. The rainfall for the state averages a little over 31 inches, though in some places it is 57 inches. It is quite evenly distributed throughout the year, and except in the extreme western part, is sufficient for successful agriculture. In the western third of the state and the prolongation forming "No Man's Land" irrigation is essential to the successful growing of crops.

MINERAL RESOURCES. Extensive beds of both bituminous and semi-anthracite coal are found in the eastern and south central parts of the state, and the output of the mines is about 3,050,000 short tons a year. There are also deposits of gypsum of considerable value, quarries of granite and limestone and vast fields of petroleum, asphaltum and natural gas, which are rapidly being developed. Coal is the most important mineral product, and most of that mined is shipped to the states south.

AGRICULTURE. Oklahoma has excellent agricultural advantages, including a fertile soil, a salubrious climate and plenty of rainfall. The state is noted for the great variety of products which can be successfully grown. Among the cereals corn takes the lead, and in 1909 the entire crop amounted to 55,632,000 bushels. Wheat and oats are also important crops, but in money value, cotton is next to the corn, and the output for the entire state for 1909 was

800,000 bales of 500 pounds each. Vegetables and fruits are also extensively grown. In the western part of the state the raising of live stock receives more attention than tilling the soil, and here large numbers of cattle, horses, mules, sheep and swine are raised and marketed. The total value of the leading crops in 1909 was \$121,996,000; the total value of horses, mules, hogs and cattle in 1909 was \$137,592,124.

MANUFACTURES. The manufacturing industries are in a formative stage, but are being rapidly developed. In the Indian reservations many hand-made goods, such as baskets, blankets and moccasins, are produced, and in the wheat-growing regions there are numerous flour mills. Two large cement plants manufacture a high grade hydraulic cement. In the cotton region, which includes all of the southern half of the state, are numerous cotton gins and mills for the manufacture of cottonseed oil and oilcake. Lumbering is quite extensive in the south central part of the state, in the Chickasaw reservation, where also there is considerable manufacturing of other sorts.

TRANSPORTATION AND COMMERCE. Trunk lines of railway traverse the state from east to west, from north to south and from northeast to southwest. Railways had been constructed through the region before Oklahoma was opened to settlement, and were pioneers in the development of the territory. In all, in 1910 the state had about 6000 miles of railway and all important towns were on one or more lines. The important railway centers are Muskogee, McAlester, Tulsa, Oklahoma City, Chickasha, Guthrie and Enid. The rivers are not navigable, and inland towns rely upon carriage roads for finding an outlet to the railways. The commerce of the state, considering its population and very recent development, is unusually large. The exports consist of corn, cotton, live stock and lumber, together with other agricultural products, while the imports are almost entirely of manufactured goods.

POPULATION. In 1900 the population of the two territories, Oklahoma and Indian Territory, was 639,177. Of this number, 336,497 were in Oklahoma, and 302,680 were in Indian Territory. Since that date the white population has been very materially increased. In Indian Territory there were, in 1900, 52,510 Indians and 36,870 negroes. In 1910 the population of Oklahoma was 1,657,155. The increase in population has been caused by the immigration of whites, and the negro and Indian population remains nearly

stationary. Most of the Indians belong to the Five Civilized Nations, the Cherokee, the Chickasaw, the Choctaw, the Creek and the Seminole (See *History*, below). Besides these, there are several other tribes on reservations, including the Modoc, the Osage, the Ottawa, the Seneca, the Shawnee and the Wyandotte.

CITIES. The chief cities are Oklahoma City, the capital; Guthrie, Muskogee, Tulsa, Enid, Shawnee, McAlester and Chickasha.

EDUCATION. On the organization of the territory, Oklahoma established an excellent system of public schools and reserved two sections of land from each township, the income from which should go toward the creating of a public school fund. This fund is supplemented by county funds, district taxes and from other sources. The public school system includes primary schools, high schools in cities and large towns and in counties having 6000 or more inhabitants; also six normal schools, at Edmond, Tahlequah, Ada, Durant, Weatherford and Alva. The school attendance in 1909 was 375,000. The higher institutions of learning include the University of Oklahoma at Norman, the agricultural and mechanical college at Stillwater and Langston University for colored youth at Langston. Separate public schools are also maintained for colored children. There are, in addition to the state institutions, a number of denominational schools throughout the state. The educational system in the portion of the state that was formerly Indian Territory has until somewhat recently been entirely in the hands of the civilized tribes or of missionaries. Each of these nations has maintained a public school system, but the inefficiency in management led to poor results, and the political status of white settlers within the nations was such that their children were deprived of school advantages. The government, therefore, in 1898 provided a public school system, and a territorial superintendent of education was placed in charge of the schools. Each nation maintains a number of institutions of academic rank, some of which are sufficiently advanced to prepare their pupils for entrance to eastern colleges. Under the enabling act the schools of this part of the state, with those of Oklahoma proper, are merged in one state system. See FIVE CIVILIZED TRIBES; INDIAN, EDUCATION OF THE.

INSTITUTIONS. The state school for the deaf is located at Sulphur, the school for the blind, at Fort Gibson. The state hospitals are at Fort Supply and Enid. The penitentiary is at

McAlester, with a branch at Granite. District agricultural schools are at Warner, Lawton, Goodwell, Tishomingo, Broken Arrow and Helena.

HISTORY. The region included within the bounds of Oklahoma was set apart in 1832 as a residence for the Indian tribes who were removed from the Southern states, with the guarantee that within this domain they should be allowed to exercise their tribal form of government and remain undisturbed. Most of these tribes inaugurated forms of government similar to the government of the states, but the region assigned was much larger than they could occupy with profit, and several attempts were made by white adventurers to settle upon the portion of the territory that afterwards was erected into Oklahoma Territory. Since this could not be done without gaining the consent of the Indians, this portion of the region was purchased from them by the government and in 1889 was thrown open to settlement. The opening of Oklahoma Territory witnessed the most remarkable rush for land ever known in this or in any other country. More than 50,000 people entered the territory and filed claims on the day of the opening. Cities arose in a night, and the next year the territory was organized. From the date of opening, Oklahoma continued to prosper, and her increase in wealth and population was beyond all expectation. Just before the final adjournment of the Fifty-ninth Congress, in 1906, an enabling act, combining Oklahoma and Indian Territory and providing for their admission into the Union as one state, was passed. This did no violence to the Indian tribes within the state, since, in accordance with a previous arrangement with the government, tribal relations ceased in Indian Territory in 1906. The Constitutional Convention, composed of 112 delegates, met in Guthrie, November 20, 1906, and drafted a constitution, which was adopted at a general election held September 17, 1907.

Oklahoma City, OKLA., the capital of Oklahoma and the county-seat of Oklahoma co., 31 mi. s. of Guthrie, on the North Fork of the Canadian River and on the Atchison & Santa Fé, the Chicago, Rock Island & Pacific, the Saint Louis & San Francisco and other railroads. Oklahoma County and the surrounding country is a fertile agricultural region, producing wheat, corn, cotton, broom corn, alfalfa, fruits, grapes, cattle and hogs. The city has a large and rapidly growing trade and contains flour mills, ice factories, packing houses, foundries, grain

elevators, cotton gins, oil mills and compresses, brickyards and other factories. Epworth University is located here, and the city has a Carnegie library, good public schools and more than a score of churches. There are 21 banks, four theaters and numerous hotels. The city has 45 miles of electric railway. Four large public parks have been set aside at the four angles of the city, connected by a system of boulevards. Oklahoma City showed an increase of 540 per cent in the population from 1900 to 1910. Population in 1910, 64,205.

Oklahoma, UNIVERSITY OF, a co-educational college established at Norman, Okla., in 1892, and supported by the state. It consists of the college of arts and sciences and schools of fine arts, mines, medicine, pharmacy and law and a preparatory department. The department of geology and natural history for Oklahoma has also its headquarters at the university. The faculty has 120 members. There are about 1200 students. The library contains over 22,000 volumes.

Oldenburg, *ole'den boorK*, a grand duchy in the northern part of Germany, consisting of three distinct territories—the duchy of Oldenburg, the principality of Lübeck and the principality of Birkenfeld. The total area is 2479 square miles, of which the duchy of Oldenburg constitutes seven-eighths. The duchy of Oldenburg is bounded on the north by the North Sea, on the east by Hanover and Bremen and on the south and west by Hanover. The country is flat, the soil marshy and sandy, with little of it under cultivation and with large tracts of heath and forest. The chief river is the Weser. The principal crops are cereals, hay, potatoes, beans and rape. Stock breeding is extensively carried on, and there are manufactures of tobacco, corks, knit goods, linoleum and brick. The constitution of the grand duchy of Oldenburg provides for a representative house of one chamber, which ordinarily assembles every three years. The principalities of Lübeck and Birkenfeld have separate provincial councils. The grand duchy is represented by one member in the Bundesrath and three in the Reichstag. The capital of the grand duchy is Oldenburg. The first count of Oldenburg of whom there is any record lived in the thirteenth century. In the fifteenth century a count of Oldenburg became king of Denmark, and two centuries later Oldenburg came into the possession of the crown of Denmark. In 1777 the state was made a duchy, and in 1815 it was raised to the rank of

a grand duchy and given increased territory. It became a part of the German Empire in 1871. Population in 1910, 483,042.

Old Forge, PA., a borough in Lackawanna co., 4 mi. s. w. of Scranton, on the Lackawanna River and on the Delaware, Lackawanna & Western railroad. The mining of anthracite coal is the principal industry, but there are also chemical and fertilizer works, a silk mill and a glass factory. The borough has a fine high school building. It was settled in 1830 and was incorporated in 1899. Population in 1910, 11,324.

Oldham, old'am, a town of England, in Lancashire, 7 mi.-n. e. of Manchester. The spinning and weaving of cotton are the staple industries and engage within the town and its vicinity about 300 mills. There are also machine shops, foundries, tanneries, silk factories and wool-weaving works. Population in 1911, 147,483.

Old Ironsides. See CONSTITUTION, THE.

Old Point Comfort, a favorite watering place of Virginia, situated at the mouth of the James River, near the southern end of Chesapeake Bay, and 14 mi. n. of Norfolk. It is on the Chesapeake & Ohio and the New York & Philadelphia railways. Because of its equable temperature, being cool in summer and warm in winter, this is one of the most desirable resorts on the Atlantic coast, and it is frequented by large numbers of tourists.

Old Red Sandstone, the name of an extensive group of rocks found in Scotland and Wales, where the formations reach a thickness of from sixteen to twenty thousand feet. The rocks are shales, conglomerates and red sandstones, the last of which is so prominent as to give the system its name. In the present geological classification, the old red sandstone is known as the Devonian system. It was this formation that Hugh Miller made famous in his works.

Old South Meeting House, a famous church built in Boston about 1730, on the site of a former church built in 1669 on land formerly owned by John Winthrop. During the pre-Revolutionary period, the church was the scene of many notable public gatherings, and during the siege of Boston it was used as a riding school by the British soldiers. It now serves as a museum of historical relics and as a hall for lectures upon historical and patriotic subjects.

Old Town, ME., a city in Penobscot co., on the Penobscot River, 12 mi. above Bangor, and on the Maine Central and the Bangor & Aroostook railroads. It is an important lumbering

center and contains manufactures of wood pulp, canoes, boots, shoes, woolens, medicines, chemicals and other articles. The city has a public library and a hospital, and the other prominent buildings include the city hall, the high school and Odd Fellows Block. It was settled in 1820 and was chartered as a city in 1891. Population in 1910, 6317.

Olean, o le an', N. Y., a city in Cattaraugus co., 70 mi. s. e. of Buffalo, on the Allegheny River, at the mouth of the Olean Creek, and on the Erie, the Pennsylvania and other railroads. It is in a region containing oil fields and hemlock and other forests; and it has oil refineries, tanneries, lumber mills, railroad shops, glassworks, flour mills and other factories.

The city contains the Foreman Library, a state armory and a park. Many famous races have been run in the driving park here. Another feature of interest in the vicinity is the massive collection of conglomerate rocks known as Rock City. The place was settled in 1804 and was chartered as a city in 1893. Population in 1910, 14,743.

Oleander, a plant known, also, by the name of *rose bay*, a beautiful evergreen shrub, belonging to the dogbane family. It produces large pink or white, rose-like flowers in clusters and has thick, shining leaves. The plant, especially the bark of the root, is medicinal and poisonous.

Oleic Acid, an acid resulting from the action of olive and some other oils upon potash. It enters largely into the composition of soaps, forming, with potash, soft soap, and with soda, hard soap.

Oleomargarine, *o le o mahr'ga rin*, a fat made from suet, oil, butter, milk and cream and used in the place of butter. In the process of manufacture the leaf tallow of beef is thoroughly



OLD SOUTH MEETING HOUSE

ceased and cooled, then cut into small pieces and cooked in a temperature of about 150°. After cooking, the fat is allowed to cool for a day, when it is placed in a powerful press, which forces out the oil. This is called oleo-oil. This is one of the purest fats, is of a slightly yellowish color and has an agreeable taste. When oleomargarine is desired, this oil is mixed with proper proportions of thin milk and cream, and the entire mixture is churned for about ten minutes. The compound is then worked, salted and packed ready for market.

BUTTERINE. Butterine is a variety of oleomargarine, in which leaf lard is mixed with the oleo-oil and a small quantity of finely chopped leaf is added to the compound of oleo, fat, butter and cream. Butterine is of better quality than oleomargarine and is used quite extensively in the place of butter.

While oleomargarine and butterine are fully as digestible as butter, their manufacture has for many years been opposed by farmers and dairymen on the ground that they reduce the price of butter. Because of this influence, Congress has from time to time taxed manufacturers of these products, and in 1902 the tax was increased to ten cents a pound for all oleomargarine or butterine colored to resemble butter. The same tax was also extended to all renovated butter. Most of the oleomargarine produced in the United States is manufactured by the large packing houses. See **BUTTER**.

Olfac'tory Nerve. See **SMELL**.

Oligarchy, *ol'i gahr ky.* See **GOVERNMENT**.

Oligocene, *ol'i go seen,* **Epoch,** the name given by European geologists to that portion of the Tertiary period extending from the Eocene to the Miocene epoch. In the United States this term is little used. See **EOCENE EPOCH**; **MIocene EPOCH**; **GEOLOGY**; **TERTIARY PERIOD**.

Oliphant, *ol'e fant,* **LAURENCE** (1829-1888), an English traveler and writer. He studied law at the University of Edinburgh, traveled extensively in southern Russia and the Crimea, became private secretary to Lord Elgin when he was governor-general of Canada, and subsequently accompanied him (1859) on his mission to China and Japan. Returning to Europe, he became Paris correspondent to the *Times*; entered Parliament in 1865, but retired three years later, and, after his attempt to found a Socialistic religious community had failed, resided principally in Palestine, near Mount Carmel. Besides frequent contributions to periodical literature, he published *Journey to*

Khatmandu; The Russian Shores of the Black Sea; Patriots and Filibusters; Piccadilly, a novel; *Traits and Travesties; Altiora Peto,* and *Scientific Religion*.

Oliphant, **MRS. MARGARET** (1828-1897), an English writer, born at Wallyford, Scotland. She was married to her cousin, Francis Oliphant, but he died seven years after the marriage, and Mrs. Oliphant, left with three children, turned to novel writing as a means of support. She produced a large number of novels, all of which are of careful workmanship. None of them, however, can rank as truly great fiction. Among her works are *The Chronicles of Carlingford*, which include *The Rector and the Doctor's Family* and *Salem Chapel*; *A Widow's Tale*; *A Little Pilgrim in the Unseen*, and *Harry Joscelyn*. Of the works of Mrs. Oliphant which are not fiction may be mentioned *The Makers of Florence*; *The Makers of Modern Rome*; *The Literary History of England from 1790 to 1825*, and *The Victorian Age of English Literature*.

Olive, a fruit tree, of which there are several species. The common olive is a low, branching,



OLIVE

evergreen tree, from twenty to thirty feet high, with stiff, narrow, dusky-green or bluish leaves. The flowers are small and white and appear in June, July or August. The fruit is a plum-like berry, with a thin, smooth skin and a hard stone, surrounded by a soft, greenish pulp. This tree is a native of Syria and other Asiatic countries, but it is now cultivated in almost all warm, dry parts of the world. It grows slowly and lives for a long period of time. As its age

increases, the trunk becomes gnarled, broken and twisted into odd shapes and even appears on the verge of death, but it still continues to produce great quantities of fruit. The wood is yellowish, beautifully streaked with dark lines, and can be brightly polished. It is serviceable in making boxes and small fancy articles. From earliest times the olive tree has been held in veneration throughout the East. Among the Greeks it was sacred to Minerva, and olive wreaths were used by both Greeks and Romans to crown victors. The olive tree is associated with the garden of Gethsemane and with many of the scenes described in both the Old and the New Testaments. To this day it is recognized everywhere as the symbol of peace.

Olive Oil, an oil extracted from the fruits of the olive tree. In the preparation of this the olives are taken, as soon as picked, to a press, where they are run through a machine which crushes them into fine pulp. This is packed into short, open-mouthed baskets of rushes, several of which are put together into a press, which squeezes out the oil into tubs half filled with water. The oil remains at the top, and the impurities sink through the water to the bottom. The pulp is gathered together after passing through the press the first time and is usually sent through three times more, each successive pressure producing oil of a different grade. The oil is filtered and clarified until it becomes a beautiful golden-yellow, when it is considered suitable for the table. As a matter of fact, much that is sold under the name of olive oil is peanut oil or cottonseed oil or badly adulterated olive oil. California has become one of the greatest olive-producing regions in the world.

Olives, **MOUNT OF**, or **Mount Olivet**, a hill on the east side of Jerusalem, from which it is separated by the valley of Jehoshaphat and the brook Kedron. The principal summit has the name Mount of Ascension, and here stands the modern Armenian Church of the Ascension. But according to the Scriptures the scene of the ascension was near to Bethany (*Luke xxiv, 50*), which is on the farther side of the hill from Jerusalem. A short way above Bethany is a nearly flat part of the hill, on which hundreds of people might congregate, and it is here, it is said, that Christ ascended into heaven. At the foot of the hill lay the Garden of Gethsemane, and round its eastern and southern side is the road by which Christ made his triumphal entry into Jerusalem.

Olmsted, *om'sted* or *um'sted*, **FREDERICK LAW** (1822-1903), an American landscape architect, born at Hartford, Conn., educated at Yale University and Amherst College. He first engaged in farming, but, after several trips to Europe and through his own country, he was appointed landscape architect and superintendent of Central Park, in New York City. During the Civil War he was secretary of the United States Sanitary Commission, and by his personal visits to the camps and his tireless efforts in all directions he succeeded in instituting many measures for the relief of the sick and wounded and for the comfort of the soldiers in the field. He assisted in planning many of the largest parks in the country, including several in New York, Brooklyn, Boston, Montreal, Chicago and Milwaukee, as well as the terraces and grounds of the United States Capitol and several important features of the grounds of the World's Columbian Exposition in Chicago. He was the author of many valuable books upon agricultural methods and upon special phases of landscape gardening.

Olmütz, *ohl'müts*, a city of Austria-Hungary, in Moravia, 40 mi. e. of Brünn, on the March River, which forms almost a complete circle around it. It has a medieval cathedral and other notable churches and an old town hall, which is used as a historical museum. Among the industries are brewing, distilling, milling and the manufacture of chemicals. Olmütz was formerly the capital of Moravia, and it is still the seat of an archbishop. It was once one of the strongest fortresses in Austria, but the site of its former fortifications is now occupied by parks and boulevards. Population in 1900, 21,933.

Olney, **RICHARD** (1835-), an American statesman, born in Oxford, Mass. He graduated from Brown University at the age of twenty-one and studied law at Harvard for three years. He was elected to the Massachusetts legislature in 1874 and was a candidate for attorney-general on the Democratic ticket, but he confined himself chiefly to private practice, where he gained a wide reputation. He was appointed attorney-general of the United States by President Cleveland in his second term, and in this office he gained fame for his successful effort to break the Pullman strike in Chicago in 1894 by the use of a Federal injunction. Olney became secretary of state in 1895, on the death of Secretary Gresham. He conducted the negotiations leading to the arbitration of the British-Venezuela controversy and caused wide

comment by his firm and vigorous letter of instructions to Ambassador Bayard at London. He was several times much talked of as a possible candidate for the presidency on the Democratic ticket.

Olymp'ia, a valley in Elis, Greece, the scene of the famous Olympic games. Here were collected thousands of statues of the gods and of victors in the games, treasure houses full of votive offerings, temples, altars, tombs—in short, the most precious treasures of Grecian art. Among the buildings were the great temple of Zeus, containing the colossal statue of the god, by Phidias, and considered one of the seven wonders of the ancient world; the temple of Hera, the oldest building at Olympia; the twelve treasure houses, and the building in which the Olympic victors dined after the contests (See OLYMPIAN GAMES). These were all surrounded with walls. Recent excavations have brought to light numerous valuable fragments of sculpture, bronzes, coins and terra cottas. The most important of the sculptures found there is the *Hermes* of Praxiteles.

Olympia, WASH., the capital of the state and the county-seat of Thurston co., is on Puget Sound about 100 mi. n. of Portland, Ore., and 65 mi. from the Pacific coast, and on a branch of the Northern Pacific Railroad. The city has a beautiful location on a peninsula near the head of the sound, with mountains on each side of the valley. The chief buildings are the capitol, the county courthouse, the high school, the McKinny block, the Saint Peter's Hospital and the Capital National Bank. The leading manufactures include lumber and lumber products, earthenware, shoes, soap and other products. Abundant water power is furnished by the Des Chutes River, which in a series of cascades has a fall of 85 feet. The city has waterworks, gas, electric lights and a good system of sewage. The first settlement in Washington was made near Olympia in 1846. It was incorporated in 1859, the same year that Washington was admitted as a state. Population in 1910, 6996.

Olympiad, the period of four years between each celebration of the Olympic games, by which the Greeks computed time. The first recorded Olympiad began in 776 B. C.

Olymp'ian Games, the most prominent and elaborately observed of all Greek festivals, celebrated in honor of Zeus, on the plain of Olympia. The "Sacred Grove," containing the sanctuaries connected with the games, enclosed a beautiful spot 660 by 580 feet in extent, adorned with

temples, monuments, altars and theaters, and was crossed by a road called the Pompic Way, along which all the processions passed. Here was located the Olympium, dedicated to the Olympian Zeus. The place also contained a colossal statue of the god, the masterpiece of the sculptor Phidias. At first, only the Peloponnesus patronized the Olympian games, but gradually the other Greek states joined in them. Originally none but those of pure Hellenic blood were permitted to participate in them, but after the conquest of Greece by the Romans the competition became general, and Roman emperors figured among the lists of victors. The games consisted of running, wrestling and other athletic exercises, and the victor was crowned with garlands and honored with triumphal processions. See OLYMPIADS.

The revival, in 1896, of the Olympic games, after a cessation of exactly 1500 years (the edict forbidding them having been issued by the emperor Theodosius in 396), was an event of historic interest and gave the modern Greeks a coveted opportunity to compete with other nations in the field of athletics. The members of the royal family of Greece participated in the festivities and engaged in the competition for prizes, while the king in person distributed the awards. The stadium erected was an exact reproduction of that of Herodius Atticus, and the arena was capable of seating 70,000 spectators. Among the performances was a long-distance foot-race from Marathon to Athens, for which a special amphora, or cup, was given, in memory of the plucky runner of old, who died in bringing to Athens the news of the rout of the Persians. These great meetings have become a feature of international life. Games were held at Paris in 1900, Saint Louis in 1904 and in 1908 in the Stadium at Shepherd's Bush, London, July 13-25. The events included races, bicycling, swimming, rowing, wrestling, tennis, archery and others sports. The United Kingdom won, with a score of 155 points, and the United States followed with a score of 131 points. In 1912 the games were held at Stockholm, Sweden, where Sweden was first with 133 points, the United States being second and Great Britain third. In the field and track events the United States led by a large margin, Great Britain being second, Russia third and Sweden fourth. This order was not disturbed by the subsequent disqualification of James Thorpe, American, who won the all-around championship.

Olym'pus, the name given by the ancients to several mountains or mountain chains. There was one in Mysia, one in Cyprus and one, the most famous of all, between Thessaly and Macedon. This, which reached a height of over 9700 feet above the sea level, was the highest mountain in Greece and was in early times regarded as the home of the gods. In after times, however, when the ideas of men were enlarged, the gods were regarded as dwelling, not on the top of the mountain but in a region above it, to which was also given the name of Olympus.

Olyphant, *ol'e fant*, P.A., a borough in Lackawanna co., 5 mi. n. e. of Scranton, on the Lackawanna River and on the Delaware & Hudson and the New York, Ontario & Western railroads. Mining and shipping of anthracite coal are the principal industries, and there are also powder mills, machine shops and iron works. It was settled in 1857 and was incorporated in 1877. Population in 1910, 8505.

Omaha, NEB., the largest city of the state and the county-seat of Douglas co., situated on the Missouri River, 492 mi. w. of Chicago, on the Union Pacific, the Chicago & Northwestern, the Chicago, Milwaukee & Saint Paul, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Illinois Central and other railroads. Interurbans connect the city with the surrounding territory. The river is crossed by three great bridges. There are seven public parks, comprising about 1000 acres, and thirty-five miles of boulevards have been built. Notable buildings are the new Douglas County courthouse, the city hall, the City National Bank, the Omaha National Bank, the Union Pacific Headquarters, Woodmen of the World building, the Bee building and the two Brandeis buildings. The public library is owned by the city and contains 85,000 volumes. Forty-one graded schools and a central high school comprise the public educational institutions, the city having, besides, the medical school of the University of Nebraska; Creighton University, Creighton Medical, Dental, Pharmaceutical and Law schools; the Protestant Christian University of Omaha; Brownell Hall, under the auspices of the Episcopal Church; parochial schools of the Catholic and German Lutheran churches and the Nebraska State Institute for the Deaf. Omaha is the see city of the North Nebraska diocese of the Catholic Church, and is also the home of the Methodist Episcopal and Episcopalian bishops presiding over the districts in the West.

The city is an important railroad center and distributing point, and has an extensive wholesale trade, especially in corn, other agricultural produce and sheep. The leading manufactures include butter, meat products, locomotives, cars and other railroad supplies and numerous other products. Omaha is the headquarters of the Union Pacific Railroad, which has large shops here. It is the headquarters of the Department of Missouri, United States Army, and two military posts are maintained near the city.

The first settlement was made in 1854, and for thirteen years Omaha was the capital of the territory and state. It was named after the Omaha Indians. Population in 1910, 124,096.

Oman, *o mahn'*, a sultanate in the southeastern part of Arabia, partly on the Persian Gulf and partly on the Indian Ocean. Its area is estimated at 80,000 square miles, and its population at 1,000,000. The chief features of the country are the stretches of barren sand and rock; the mountains near the coast, which rise in places to 10,000 feet, and the fertile valleys and plains, which yield an abundance of sugar, coffee, rice, cotton and fruits. Dates constitute the chief product and the largest export. The country is the richest part of the peninsula, both in agricultural products and in mineral resources. The inhabitants are mostly Arabs, but there is a considerable admixture of Hindus, Persians and negroes. The form of government is a monarchy, the ruler being known as the *imam*. The capital is Muscat.

Omar I, *o'mahr*, (581?-644), successor of Abu-bekr, and second caliph of the Mohammedans. He became a follower of Mohammed about 615 and succeeded to the caliphate in 634. His rule is celebrated for the great extension of Mohammedanism. The conquest of Syria was completed by one of his generals; another general was equally successful in Egypt, and when, in 638, Jerusalem was compelled to surrender, Omar hastened thither himself, in order to dictate the terms. Omar's generals likewise invaded Persia and conquered the capital and kingdom. The Mussulmans pursued their conquests far into Africa, but Omar did not live long to enjoy his glory.

Omar Khayyam, *ki yahm'*, a Persian poet, astronomer and philosopher, born at Nishapur, in the latter half of the eleventh century. He wrote various scientific works which were of high value in their day, but he is now remembered chiefly for his *Rubaiyat*, a collection of epigrams in verse, which celebrate wine, love

and pleasure. These are often exceedingly pessimistic and not always refined, but many of them contain real beauty of sentiment. Edward Fitzgerald translated freely into English verse a portion of the *Rubaiyat*.

O'mens, certain signs or phenomena supposed to portend some impending good or evil fortune. Among the ancient Romans the taking of omens was a public institution of great importance. See **AUGURS**.

Om'nibus, a four-wheeled enclosed carriage, with a long body, with seats running lengthwise along the sides and containing numerous windows. In some cities omnibuses have seats on top, also. Previous to the construction of street railways, the omnibus was in general use for conveying passengers from one part of a city to another, and it is still found in small cities and towns, where it is used to convey passengers from depots to hotels, and in some large cities, where lines of omnibuses make regular trips between different points.

Omnibus Bill, the name given frequently to single legislative acts which include many slightly related or wholly unrelated measures. In American history it is applied to the compromise measures of 1850, which, though embodied in several bills, were passed in accordance with a single plan. See **COMPROMISE OF 1850**.

Omsk, *ohmsk*, the capital and chief town of the Russian Government of Akmolinsk, situated in western Siberia, at the junction of the Om with the Irtysh, on the Trans-Siberian railway. It is an important military station, has a military school for Cossacks and several academic institutions. Its trade is considerable. Population in 1909, 88,900.

Onega, *o nye'ga*, a river in the northern part of Russia. It rises in Lake Latcha, flows in a northerly course for about 250 miles and enters the Gulf of Onega. It is navigable for steamers for about 80 miles.

Onega, **LAKE**, a lake in Russia, near the center of the Government of Olonetz and, after Lake Ladoga, the largest lake in Europe, covering an area of about 3670 square miles. It has numerous creeks, bays and islands and is well supplied with fish. It discharges by the Svir River into Lake Ladoga.

Oneida, *o ni'da*, once an important indian tribe inhabiting central New York. A remnant in Wisconsin is well advanced in civilization. See **FIVE NATIONS**.

Oneida, N. Y., a city in Madison co., 110 mi. n. w. of Albany and 5 mi. s. e. of Oneida Lake,

on the New York Central and the New York, Ontario & Western railroads. The city has a considerable trade in fruit and farm and dairy produce, and contains manufactures of furniture, carts, caskets, pulleys, cigars and various other articles. There are four banks, eight churches, a good high school, a city hospital and an old ladies' home. Two miles south of the city is the Oneida Community, and the village of Oneida Castle is about four miles to the south, on the site of the headquarters of the Oneida indians. Oneida was settled in 1839 and was chartered in 1901. Population in 1910, 8317.

Oneida Lake, a lake in the State of New York which forms the boundary between Onondaga and Oswego counties. Its length is about 16 miles, its width, 4 miles. Its waters unite with the Seneca River to form the Oswego.

O'neon'ta, N. Y., a village in Otsego co., about 70 mi. s. w. of Albany, on the Susquehanna River and on the Delaware & Hudson and the Ulster & Delaware railroads. It has a state normal school, a public library, a state armory and the Fox Memorial Hospital. There is a considerable trade, and the village contains railroad shops, silk, planing and knitting mills, foundries and cigar factories. It was settled about 1800 and was incorporated in 1848. Population in 1910, 9491.

Onion, *un'yun*, a well-known plant, the bulbous root of which is much used as an article of food. It is a biennial herb, with long, narrow leaves and a swelling, pithy stalk. The peculiar flavor varies much according to the size of the bulb, the small reddish onions having much more pungency than the larger ones. The onion may be grown from the tropics to the coldest regions of the temperate zone. There are at least twenty varieties, Strassburg, Bermuda, Spanish and Portuguese onions being among the most esteemed. In Spain, the onion forms a large portion of the food of the poorer classes. See color plate on Lily Family under **BOTANY**, in Volume V.

On'kelos, a Greek translator of the Pentateuch, whose version is so faithful that down to the beginning of the sixteenth century it was chanted in the synagogues alternately with the Hebrew, and to the same notes.

On'omac'ritos, an Athenian soothsayer and poet of the time of Pisistratus and his sons. He was a member of the commission which Pisistratus appointed to arrange the poems of Homer and throw out what was spurious. As an interpreter of oracles, he was one time detected mak-

ing up answers and was consequently banished from Athens by Hipparchus. According to some accounts, however, he was later reconciled with Hipparchus, and we find him attempting by means of forged oracles to induce Xerxes to invade Greece.

Onondaga, *on'on daw'ga*, (people of the hill), a once important indian tribe who lived about the lake that now bears their name. They were the most peaceable of the Iroquoian confederacy and so were not often at war with the whites. A few are still to be found upon reservations in New York. See FIVE NATIONS, THE.

Ontario, formerly *Upper Canada* or *Canada West*, a province of the Dominion of Canada, bounded on the n. by Manitoba and James Bay; on the e. and n. e. by Quebec, a portion of the boundary being formed by the Ottawa River; on the s. by the international boundary line, extending through the Great Lakes, the Saint Lawrence, the Niagara, the Detroit, the Saint Clair and the Rainy rivers, and on the west by Manitoba and the international boundary line. The southeastern corner of the province touches upon New York, and the southwestern portion borders upon Minnesota. The present northern boundary between Ontario and Manitoba was established in 1912. The outline of the province is very irregular. Its greatest extent from east to west is about 1000 miles, and from north to south, about 700 miles. The area is 407,262 square miles, of which 42,000 square miles are water. This is exclusive of that portion of the Great Lakes belonging to Canada. The area of the province is a little less than that of Texas and California combined.

SURFACE AND DRAINAGE. In general, Ontario is a low plateau with a rolling or wavy surface. This regularity is broken by a height of land, which extends northwesterly from the Thousand Islands in the Saint Lawrence to the north shores of lakes Huron and Superior, where it forms the bluffs that characterize this region. This height of land nowhere exceeds 1200 feet in altitude. Another height of land, caused by the elevation of the rock over which the cataract of Niagara plunges, extends to the head of Georgian Bay, where it reaches its highest point in the Blue Mountains. It thence extends northwesterly, forming the peninsula between Georgian Bay and Lake Huron and the Manitoulin Islands. The southern part of the province bordering upon Lake Ontario is low-land.

The chief rivers are those forming the bound-

ary lines. In addition to these are the Magallowan and the Muskoka, flowing into Georgian Bay; the Thames, flowing into Lake Erie, and the Petawawa, flowing into the Ottawa. The province contains a large number of lakes. The most important of these are Rice Lake, north of the central part of Lake Ontario; Lake Simcoe, directly north of Toronto; Muskoka Lake, and Lake Nipissing.

CLIMATE. The southern part of the province bordering upon the Great Lakes has a mild and equable climate. In the severest winter weather the thermometer seldom falls lower than 8° below zero, and in the hottest months it seldom reaches 90° above. The influence of the lakes here prevents sudden or great changes, but in the northern part the extremes are greater. Here the winters are severe, and the summers are short and hot. The annual rainfall varies from 40 to 45 inches. During the winter there is sufficient snow to protect the crops and to facilitate lumbering.

MINERAL RESOURCES. Ontario contains extensive deposits of valuable minerals, but many of them have not been worked. There is no coal in the province, but in the western part of the peninsula between lakes Erie and Huron are oil fields that yield about 30,000,000 gallons a year. Natural gas is also found near Niagara and near Detroit. To the north of Georgian Bay are the Sudbury nickel mines, the largest in the world. The output from these mines is about eighteen thousand tons a year, and its value exceeds \$5,000,000. North of lakes Huron and Superior are extensive deposits of copper and iron. The copper ore is mined in large quantities, but the iron deposits have not yet been worked. Traces of gold and silver are also found in various places; the annual output of the silver mines is over \$15,000,000, while that of gold is almost negligible. Building stone and clay suitable for brick and tile are widely distributed through the province.

AGRICULTURE. Agriculture is the chief industry and occupies the attention of by far the greater portion of the inhabitants. The southern part of the province, bordering upon the Great Lakes, has a very fertile soil, and the climate is adapted to the growth of all products of the temperate climate. Forage crops, wheat, oats, barley and peas are extensively grown. Wheat is the most valuable crop among the cereals, but oats lead in acreage and in the number of bushels. In the peninsula are found extensive apple orchards, which produce fruit of an excel-

lent quality. Peaches, pears, plums and small fruits are also grown here in large quantities. The northern part of the province is better suited to the growth of hardier crops, such as potatoes, rye and root crops. Dairying and the raising of live stock are important branches of agricultural industry. Ontario has long been known for its excellent breeds of cattle and sheep, while the number of horses is increasing from year to year.

OTHER INDUSTRIES. The large shore line of the Great Lakes in Ontario furnishes opportunity for an extensive fishing industry, and the value of the annual catch is about \$2,500,000. Among the manufacturing industries, lumbering and the production of lumber and timber products are by far the most important. Formerly almost the entire province was covered by heavy forests, but about half of the area has now been cleared. The lumbering regions are around the head waters of the Ottawa River and east of Georgian Bay, where an abundance of pine, spruce and fir is still found. The manufacture of flour and grist mill products, pork packing and the manufacture of cheese and butter are also important industries, while cotton and woolen mills and other manufactories are gaining a foothold in the larger cities and towns.

TRANSPORTATION AND COMMERCE. The frontage of the Great Lakes furnishes ample opportunity for water transportation through the Saint Lawrence to the ocean (See SAINT LAWRENCE RIVER; WELLAND CANAL). The southern part of the province is traversed by the Grand Trunk and Canadian Pacific railways and other lines which cross from Detroit to Buffalo. Each of these roads has cross lines and branches extending to the most important agricultural and commercial centers within its territory. The Canadian Pacific also has a line extending across the northern part of the province and westward to the coast. In all there are about 8300 miles of railway, but a number of the counties in Ontario are still without railway communication.

The commerce is extensive. Lumber, agricultural produce, butter and cheese, nickel and some manufactured goods are exported. The principal imports are manufactured products. The United States and Great Britain have the largest share of the foreign trade.

GOVERNMENT AND RELIGION. The executive department consists of a lieutenant governor, appointed by the governor-general of the Dominion for five years, and an executive council

of eight members, each of whom is at the head of a department. The legislature is an assembly of one house of 98 members, chosen by popular vote. The courts consist of a superior court of judicature, with one high court of justice and lower courts, such as that of the King's Bench, common pleas and court of appeal. Local administration is by counties and towns.

The larger proportion of the inhabitants are of English and Scotch descent, and the population is divided between the various Protestant denominations and the Roman Catholics, who number about one-fifth of the inhabitants.

EDUCATION. Ontario maintains an excellent system of schools, which are under the immediate control of the minister of education. Uniformity as to course of study, methods of instruction and text-books is maintained throughout the province, and in addition to the elementary schools two normal schools and one normal college are maintained. Toronto University is at the head of the educational system, and all of the high schools, common schools and kindergartens are affiliated with it, as are most of the colleges and secondary schools maintained by the various religious denominations. Among the latter the most important are Knox College, Wycliffe College and Huron College, Saint Michael's College, Victoria University and the Upper Canada College, one of the oldest in the Dominion.

CITIES. The chief cities are Toronto, the capital; Ottawa, the capital of the Dominion; London, Hamilton and Kingston, each of which is described under its title.

HISTORY. Ontario was first visited by Champlain in 1615. He established friendly relations with the Huron and thus brought on war with the Iroquois, in which the Huron were nearly destroyed. During this turbulent period many Jesuit missionaries traversed the province and established stations. In 1749 a French trading station was built on the site of Toronto. The country remained a French possession until the Treaty of Paris, in 1763, when it came under British control and formed a part of the Province of Quebec. After the close of the Revolutionary War, the two provinces were separated, and Ontario was known as Upper Canada or Canada West, but in 1841 the provinces were reunited and thus remained until the formation of the Dominion of Canada in 1867, when Ontario became an independent province and a member of the federation. Population in 1911, 2,523,208.

ONTARIO, LAKE, the most easterly of the great lakes of North America, lying along the

northeast side of the State of New York and forming part of the boundary between the United States and Canada. Its greatest length is 190 miles, its greatest breadth about 55 miles and its area, 7250 square miles. The depth is about 600 feet, and the mean elevation of its surface 247 feet. It receives the waters of Lake Erie by the Niagara River and discharges its waters by the Saint Lawrence into the Atlantic, 1000 miles distant. This lake is connected with Lake Erie by the Welland Canal, with the Erie Canal and the Hudson River by the Oswego Canal, and with the Ottawa River by the Rideau Canal. It is navigable throughout its whole extent and at all seasons. The most important places on its shores are Oswego, in the United States, and Toronto, Hamilton, Kingston and Coburg, in Canada.

On'yx, a variety of agate which has its colors arranged in parallel bands. It is usually of shades of brown, green or red, alternating with white. When the red is a deep, brownish red, and the white pure and transparent, the variety is known as *sardonyx*. Onyx was formerly highly prized for making cameos, the figures being formed of one layer and the background of another, and it is still used to some extent for this purpose. *Mexican onyx* is not a true onyx, but is a translucent limestone, with iron and manganese irregularly scattered through it, producing the beautiful variegated appearance for which this stone is noted. It is found in layers in caves, where it was deposited by water. This stone was used by the Aztecs, who carved it into idols, masks and a variety of other objects. It is very soft and easily worked. See AGATE; CHALCEDONY; PRECIOUS STONES.

Onyx Marble, a very beautiful translucent limestone, colored by iron or manganese. When polished, it presents beautiful banded and clouded effects. It is found in paying quantities in Mexico, also in Arizona, California and Colorado, and is used for ornamental work in interiors, for table tops and for small articles, such as inkstands and paper weights.

O'pal, a precious stone, showing a variety of colors when subjected to the light. It consists of silica and water and is very brittle. The general appearance of the *precious opal* is whitish or milky, and the tints displayed are red, yellow, green, and blue or violet. The most brilliant variety is known as the *fire opal*, but it displays fewer colors. Opals of the finest quality are mined at Dunkirk, in Hungary. They are also found in Queensland and New South Wales,

Australia, and in Idaho and Washington, in the United States.

Open Air Schools. These schools originated in Germany in 1904, and the first one in this country was established in Providence, R. I., in 1908. The plan is to combine the best features of the sanatorium and the school for the benefit of tubercular children and those in poor physical condition. They are essentially schools taught in the open, as on roofs, or in remodeled rooms, open to the air, not artificially heated, where the children are warmly clad and furnished food. In every instance, such schools have met with marked success in converting sickly children into strong, healthy ones.

Open Shop, a place of labor where employes may work irrespective of whether they belong to labor unions or not. It is contrasted with the closed shop (where only union labor is employed). This classification represents a phase of the conflict between capital and labor. Capital insists on its right to manage its business as it sees fit, hence to employ whom it will; labor points to the benefits of unionism and insists that the closed shop is virtually a necessity to its cause. See LABOR ORGANIZATIONS.

Op'era, a musical drama, that is, a dramatic composition set to music and sung on the stage, accompanied with musical instruments and enriched by the accessories of costumes, scenery and dancing. The component parts of an opera are recitatives, solos, duets, trios, quartettes and choruses, and they are usually preceded by an instrumental overture. The chief classes of opera are the *opera comique*, or *opera bouffe*, distinguished by its light, fanciful or broadly humorous theme and treatment; *grand opera*, or *opera seria*, constructed upon more serious themes, sometimes tragic and sometimes comic, in the latter case distinguished from *opera bouffe* as comedy differs from farce; the *romantic opera*, or *opera drammatica* of the Italians, embracing a mixture of the grave and lively.

Though the Greek dramas were operatic in character, the opera proper is of modern date and of Italian origin and would seem to have developed naturally from the miracle play of the Middle Ages, the first operas dating from the sixteenth century. About the close of this century the poet Rinuccini wrote a drama on the classical story of Daphne, which was set to music by Peri, the most celebrated musician of the age. The orchestra of this first opera consisted of four instruments, namely, a harpsichord, a harp, a viol di gamba and a lute. There

Opera

was no attempt at airs, and the recitative was merely a kind of measured speech. Monteverde, a Milanese musician, improved the recitative by giving it more flow and expression. In the middle of the seventeenth century, *airs* connected in sentiment and spirit with the dialogue were first introduced. The first regular serious opera was performed at Naples in 1615. The first light opera is said to have been presented at Venice in 1624, where also the first stage for operas was erected in 1637. In 1646 the opera was transplanted to France by Cardinal Mazarin; about the same time it was introduced into Germany, and somewhat later it was taken to England.

At the beginning of the eighteenth century a revival and reform occurred, the German-Frenchman Gluck being its chief exponent, his purpose being to restore to opera the dramatic element which it had long lacked. Then began a separate national development in each of the great countries of Europe. The chief Italian composers include, besides those mentioned, Piccini, Cherubini, Rossini, Bellini, Donizetti and Verdi. Among the French composers are Meyerbeer, Grétry, Auber, Halévy, Gounod, Offenbach and Bizet. Among American composers of operas may be mentioned Reginald de Koven, Herbert, Damrosch and Sousa; and of English composers, Balfe, Macfarren, Sullivan and Thomas. It is the German composers, however, who have raised opera to the highest point of perfection, the list including such names as Handel, Mozart, Beethoven, Weber, Flotow and, finally, Richard Wagner, the most celebrated of modern composers. In his work, the vocal music of the piece is deprived of the prominent place formerly assigned to it and is made subordinate to text, instrumentation and scenic decoration. He preferred the name *musical drama* for his most characteristic works.

The following list contains the names of the best-known operas: *Aida*, by Verdi; *Barber of Seville*, Rossini; *Bohemian Girl*, Balfe; *Carmen*, Bizet; *Cavalleria Rusticana*, Mascagni; *Don Giovanni*, Mozart; *Faust*, Gounod; *Der Fliegende Holländer*, Wagner; *Fra Diavolo*, Auber; *Der Freischütz*, Weber; *Les Huguenots*, Meyerbeer; *Lohengrin*, Wagner; *Lucia di Lammermoor*, Donizetti; *Magic Flute*, Mozart; *Martha*, Flotow; *Meistersinger von Nürnberg*, Wagner; *Mikado*, Sullivan; *Norma*, Bellini; *Oberon*, Weber; *Pagliacci*, Leoncavallo; *Rienzi*, Wagner; *Ring des Nibelungen*, Wagner; *Robin Hood*, De Koven; *Robert le Diable*, Meyerbeer; *Tann-*

Ophthalmoscope

hauser, Wagner; *Tristan und Isolde*, Wagner; *Les Troyens*, Berlioz; *Il Trovatore*, Verdi, and *William Tell*, Rossini.

Opera Bouffe, *boof*, a farcical form of opera, in which the characters, subject-matter and music are intended to burlesque the more serious style of opera. When dialogue is interspersed with the music for the purpose of disclosing the plot, *opera bouffe* is known as *musical comedy*, and in this form it has been exceedingly popular in recent years, especially in England and America. The most notable of recent productions are *The Mikado* and *H. M. S. Pinafore* by Gilbert and Sullivan of England, *Rob Roy* and *Robin Hood* by Reginald De Koven, *The Idol's Eye* by Victor Herbert, *King Dodo* and *The Prince of Pilsen* by Pixley and Luders, *The Tenderfoot* by Richard Carle, and *The Sultan of Sulu* by George Ade and Wathall.

Opera Glass, a small, double telescope, used for magnifying objects at a distance. The opera glass has a double-convex lens for its object glass and a concave lens for the eye-piece. The eye-piece is attached to a rack and pinion, by means of which it can be properly focused. See FIELD GLASS; LENS; TELESCOPE.

Ophicleide, *o'f'i klide*, a brass wind instrument, generally consisting of a wide conical tube, terminating in a bell, like that of a horn, with a mouthpiece and ten holes, which are stopped by keys. Ophicleides are of two kinds, the bass and the alto; the former has a compass of three octaves and one note, ranging from B on the third space below the bass staff to C on the third space of the treble staff, including all the intermediate semitones. The alto ophicleide (an inferior instrument) has the same extent of compass, but starts an octave higher.

Ophir, *o'feer*, the region to which the Hebrews made voyages in the time of Solomon, bringing home gold, precious stones and fine wood (*I Kings* ix, 26-28; x, 11; *II Chron.* viii, 18). Some authorities believe that it was situated in Arabia; others place it in India or Africa.

Ophthalmia, *of thal'me a*. See CONJUNCTIVITIS.

Ophthal'moscope, an instrument for observing the internal structure of the eye. It consists of a mirror, by which light from an artificial source is directed into the eye of the patient, and a double convex lens, by which the illumined parts of the structure of the eye are magnified, in order that they may be more easily examined, the observer looking through a hole in the center of the mirror. The light is usually placed to

Opium

the side of and slightly behind the patient's head.

Opium, the dried juice of a species of poppy, cultivated on a large scale, principally in Hindustan and in Asiatic Turkey, but well known in many places as a garden plant, being an annual, with white, red or violet flowers and glaucous leaves. The juice is taken from incisions made in the green heads or seed capsules after the fall or removal of the petals, and the best flows from



OPIMUM POPPY

a, whole plant; b, flower and leaf; c, ripe capsule; d, seed and its section, enlarged.

the first incision. The juice, which is at first a milky liquid, soon solidifies and turns black and is then scraped off and collected. It is one of the most powerful of narcotics, and at the same time it forms one of the most important of medicines. It is employed in a great variety of cases, but it is most commonly for the purpose of procuring sleep and giving relief from pain. In medicine it is very commonly used in the form of *laudanum*, which is a simple tincture or extract in spirits of wine. Opium is also an ingredient in various patent medicines and other remedies (See MORPHINE).

In its natural state opium is heavy, of a dense texture, of a brownish-yellow color, not perfectly dry, but easily receiving an impression from the finger; it has a faint smell, and its taste is bitter and acrid. The supply of opium is brought principally from Turkey, whence it is imported in flat pieces or cakes, covered with leaves. In the case of many temperaments,

Opopsum

opium produces such agreeable effects, whether a delightful dreamy calm, a state of pleasant exhilaration, or beatific visions, that numbers of persons are led to use it habitually, as others use some form of alcoholic drink. Evil effects at least as serious as those of drunkenness follow over-indulgence in opium. Habitual users of the drug can take in a day what would kill ten or twenty persons not used to it. The habitual use of opium is most common in China, the southeast of Asia and the Malay Archipelago, where it is chiefly smoked in a special pipe. The pipe, or rather the stem of the pipe, is about the length and size of an ordinary flute, and the bowl, which is generally made of earthenware, is very small. The smoker, who is always lying down or at least reclining, takes a small portion of opium about the size of a pea on the end of a spoon-headed needle, heats it at a lamp, and then places it in the bowl of the pipe. He then brings the opium to the flame of the lamp, inhales the smoke in several inspirations, and is then ready to repeat the process with a fresh quantity of opium until the desired intoxication ensues.

Oporto, a city and seaport of Portugal, the second in size in the kingdom, capital of the district of its own name, on a steep declivity on the right bank of the River Douro, 3 mi. from its mouth and about 175 mi. n. n. e. of Lisbon. The river is crossed by two bridges of recent construction, one of which is among the largest and most beautiful bridges of its kind in Europe. Among the chief buildings of the city are the "Tower of the Clergy," a granite structure 246 feet high; the Gothic cathedral, the episcopal palace, the exchange, the crystal palace, the mint and the opera house. There are also museums, a large library, a medical college, schools of commerce and navigation and other schools of high rank, together with hospitals, art galleries and fine gardens. Oporto is the chief industrial city of Portugal. The principal trade is in wine, chiefly port wine, which is named from the town. There are manufactures of hats, silks, cotton, woolen and linen stuffs, paper, wax, tobacco, soap and other articles. Oporto was an important town during the Middle Ages. In 1808 it was captured by the French, and in the following year Wellington drove the French out of it, after the remarkable passage of the Douro. Population in 1912, about 180,000.

Opos'sum, a mammal found in America as far north as Hudson Bay. It is somewhat closely related in structure to the marsupialia. Opossums are nocturnal in their habits and live con-



ORANGES

1. Branch with Fruit and Flower.
2. Flower and Bud.
3. Pistil and Ovary.

4. Section through the Flower.
5. Plan of the Flower.
6. Blood Orange.

7. Navel Orange.
8. Tangerine.

stantly in trees, feeding on birds, insects and on almost anything which comes in their way. The females of certain species have, like the kangaroo, an abdominal pouch, in which they can hold their young. The best-known species of opossum is one which is found in the United States. It is about the size of a large cat and is whitish-



OPOSSUM

gray in color, the hair being soft and wool-like. When captured or threatened with danger, the opossum feigns death, and the phrase "playing 'possum" is on this account often used to indicate any deceitful proceeding. The flesh of the opossum is edible and is much sought after by southern negroes.

Op'per, **FREDERICK BURR** (1857-), an American illustrator, born in Madison, Ohio. For several years he was connected with Frank Leslie's magazines, *Puck* and Hearst's *New York Journal*. He made his reputation by his political cartoons during the presidential campaigns. His drawings are characterized by force and show a keen sense of humor. He has illustrated the works of Bill Nye and Mark Twain, and Peter Dunne's *Mr. Dooley*. He also ranks as an author of some note, having written *Folks in Funnyville*, *John Bull*, *Happy Hooligan*, *Alphonse and Gaston* and *Our Antediluvian Ancestors*.

Optic Nerve. See **EYE**.

Optics. See **LIGHT**.

Optimism, *op'ti miz'm*, the philosophical belief or doctrine that a perfect principle underlies, and is manifested in, the seemingly imperfect life of the universe. The final supremacy of good is maintained by this doctrine. "All is for the best" is the motto of the optimist. Socrates and Plato in their systems of philosophy strongly support this view and affirm that Good is the all-wise, eternal governor of the universe. To a greater or less extent, every one believes in optimism, and it may be said to be the foundation of hope.

One who habitually looks upon the bright side of life and sees ultimate good in all things is called an *optimist*. See **PESSIMISM**.

Oracles, the answers which the gods of the Greeks, Romans, Egyptians and other ancient peoples were supposed to give, by words uttered or otherwise, to those who consulted them upon any occasion; also, the places where these answers were received. The belief in oracles was so great that vast numbers flocked to them for advice, and scarcely any war was waged, or peace concluded, or new form of government instituted, or new laws enacted, without the approbation of some oracle. The Greek oracles were the most celebrated, and among these the earliest, and one of the most famous, was that of Jupiter at Dodona. Apollo had many oracles, but that at Delphi held the first place, and it was often applied to for explanation of obscure answers obtained at Dodona. Another famous oracle of Apollo was in the island of Delos. The Romans had no important oracles of their own, but often consulted those of Greece and Egypt. The Greek oracles long maintained their standing, and sank only with the freedom and independence of Greece. Under the reign of Theodosius, the temples of the prophetic deities were closed or demolished. See **DODONA**; **DELPHI**.

Oran, *o rah'n'*, a seaport of Algeria, capital of the Department of Oran, 260 mi. w. s. w. of Algiers. It is a well-built town, and its aspect is largely French. The harbor was formerly at Mers-el-Kebir, about 3 miles from the town, but within recent years accommodation for shipping has been provided at Oran itself. The new harbor, however, is not as good as the old. The city has a considerable trade, and its chief exports are cereals, wine, olives, brandy, flour, esparto grass and sheep and cattle. Oran was built by the Moors, was captured by the Spaniards in the early sixteenth century, two hundred years later was taken by the Turks and in 1708 was regained by the Spaniards. In 1791 an earthquake practically destroyed the town, and the Spaniards abandoned it. It was taken by the French in 1831. Population in 1911, 123,086.

Orange, *or'enj*, a fruit related to the lemon, lime and citron. The orange is a native of China, India and other Asiatic countries, and was first introduced into Portugal about 1520. It is extensively cultivated in the south of Europe and in Florida and California, also upon the Azores, in northern Africa, in the West Indies

Orange

and in Australia. The orange tree is small and has broad, green leaves. Under the most favorable circumstances it seldom exceeds thirty feet in height, and in cultivation it is kept much lower. The branches are low, and the flowers are white and wax-like; because of their beauty and fragrance orange blossoms have long been worn in almost all parts of the world by the bride on her wedding day.

The fruit is nearly spherical, bright yellow in color, and contains a pulp which consists of a collection of oblong segments, filled with a sugary and refreshing juice and in most varieties containing several seeds. There are many varieties under cultivation, but those in greatest demand in the United States are the *navels*, which are seedless. This orange was introduced from Brazil and is now grown in large quantities in California. *Blood oranges* are so called from the color of their juice, which is dark red. The oranges grown in Florida are generally known as *russets*. They are of a lighter yellow than the others, and the peel has a bronze coat which gives the orange its name. The *mandarin* orange, introduced from China, is small and somewhat flattened.

When sufficiently ripe, oranges are picked by hand, sorted as to size, wrapped in tissue paper and packed in boxes for the market. The California oranges are usually shipped in refrigerator cars, so that they reach their destination without damage. The orange industry in California and Florida is one of great importance to those localities. California has over 6,000,000 trees, and Florida about half as many. The orange is a popular dessert.

Orange, MASS., a town in Franklin co., 37 mi. n. by e. of Springfield, on Millers River and on the Boston & Maine railroad. It is built on a hill above the river, and contains manufactures of sewing machines, motor carriages, water wheels and other machinery, furniture, shoes and other articles. There are three attractive parks and a public library. The town was incorporated in 1810. Population in 1910, 5282.

Orange, N. J., a city in Essex co., 4 mi. n. w. of Newark, on the Delaware, Lackawanna & Western, the Erie and several electric railways. It is situated on the slopes of Watchung Mountain, at an elevation of 150 to 200 feet. It has become a noted residence place and contains many fine homes of Newark and New York City business men. Llewellyn Park, of 750 acres; Hemlock Falls, in wild, picturesque

Orange Free State

scenery, and Eagle Rock, on the east brow of the mountain, are places of considerable interest. The principal structures are the Stickler Library, Decker and Metropolitan buildings, Music Hall, Memorial Hospital, an orphan home, the House of the Good Shepherd, the Masonic Temple and the old First Presbyterian Church. The city also contains the Seton Hall College, Locke College for boys, a public library and a number of athletic and social clubs. The laboratory of Thomas A. Edison is located near Llewellyn Park. Hat making is the most important industry, and there are also printing plants and other works. The place was settled about 1666, was separated from Newark and incorporated as a town in 1806 and was chartered as a city in 1870. Population in 1910, 29,630.

Orange, TEX., the county-seat of Orange co., on the Sabine River, about 10 mi. above its mouth, and on the Southern Pacific Railroad, 90 mi. n. e. of Galveston. It has extensive lumber mills, shingle mills and other manufacturing establishments. Population in 1910, 5527.

Orangeburg, S. C., the county-seat of Orangeburg co., on the North Edisto River and the Atlantic Coast Line and Southern railroads, 51 mi. s. of Columbia. The industries are related to cotton, rice and lumber. Among the educational institutions are Claflin University and the Normal Industrial, Agricultural and Mechanical College, both for colored students. Population in 1910, 5906.

Orange Free State, a province of the Union of South Africa, a colony of Great Britain, s. of the Transvaal, n. of Cape of Good Hope and w. of Natal and Basutoland. Its area is estimated at 50,389 square miles, or about the same as that of Louisiana. Lying at a height of about 4000 feet above the sea, the country, which is composed chiefly of vast undulating plains, is cold in winter, with violent thunder storms and long droughts in summer. The climate is, however, very healthful. Pasturing is the chief occupation, and wool, hides and ostrich feathers are among the principal exports. Agriculture is increasing in importance, and corn is exported in considerable quantities. Diamonds and other precious stones have been found in paying quantities. Rich coal mines exist, and the country is said to abound in other mineral wealth. There are over 400 miles of railway in operation, the chief line being the one which connects Bloemfontein, the capital of the colony, with the Transvaal railway systems.

The province is governed by the Administrator, appointed by the Governor-General for a term of five years, and by the provincial council, of 25 members, elected for three years. Education, while under the control of the government, is neither free nor compulsory. In 1836 a colony of Boers from Cape Colony, dissatisfied with the British rule there, entered the territory which is now the Orange Free State. The British annexed the territory in 1848, but in 1854 it was declared a free state. When war broke out between the South African Republic and Great Britain, the Orange Free State joined the former, and as a result of British successes was declared a possession of the British crown in 1900. Population in 1911, 528,174. See SOUTH AFRICA, UNION OF.

Orange River or **Gariiep**, a river of South Africa, which forms part of the northern boundary of Cape Colony and which falls, after a course of almost 1300 miles, into the Atlantic. Its volume varies greatly, and it is useless for purposes of navigation, owing to the bars, rapids and shallow places.

Orang'-utan' or **Orang-outang**, one of the anthropoid, or manlike, apes, or monkeys. It



ORANG-UTAN

reaches a height of four or five feet and is second in size only to the gorilla. It is one of those animals which approach most nearly to man, being in this respect only inferior to the chimpanzee and gorilla. It is utterly incapable of walking in a perfectly erect posture. Its body is covered with coarse hair, of a brownish-red color, but the face is destitute of hair, save at the sides. The arms reach to the ankle joint, the hind legs are short and stunted and the nails of the fingers and toes are flattened. The orang-utans swing themselves quickly along from tree to tree, by the aid of their long arms, but their gait on the ground is awkward and unsteady. They are remarkable for strength

and intelligence and are capable of being tamed, if captured when young. They feed chiefly on fruits and sleep in trees. The orang-utan seems to be confined to Borneo and Sumatra. See MAN; APE; MONKEY.

Orat'ion, an oral address, for the purpose of persuasion, containing high thoughts and sentiments, expressed in elegant language. Orations may be of several classes: *demonstrative*, in which the purpose of the speaker is less to persuade than to please his audience; *deliberative*, or *exhortative*, in which the speaker aims to secure a certain decision, to arouse people to action or to convince them of a truth; *judiciary*, used chiefly by advocates in court, characterized by clearness, close logic and earnestness. The oration was the form of literature first to be developed to comparative perfection. It advanced through all the stages from the exhortation of armies by their commanders to the addresses in behalf of great causes in modern free deliberative assemblies. Among the Greeks were many famous orators, of whom Isocrates, Demosthenes, Aeschines and Pericles are especially famous. The names of Cicero, Mark Antony and Cato represent Roman oratory at its best. From the downfall of the Roman Empire until the late modern period, oratory suffered a decline, but at the time of the American and French Revolutions there was another awakening, signified by such names as Pitt, Mansfield, Sheridan, Burke, Fox, Patrick Henry, James Otis, Alexander Hamilton and Richard Henry Lee. Probably in no equal period in the history of any nation have so many remarkable orators arisen as during the slavery controversy in the United States: Calhoun, the spokesman of the South; Webster, the representative of the North; Clay, the compromiser and defender of the Union; Sumner, the advocate of universal liberty; Douglas, the expounder of state sovereignty; Everett, one of the greatest scholars and rhetoricians of his time; Choate, unsurpassed as a forensic orator; Phillips, the agitator; James G. Blaine, the political orator; George William Curtis, the supporter of independence and honesty in politics, and last, but by no means least important, Abraham Lincoln, who deserves mention, if for no other reason than that he gave to the world the marvelously concise and inspiring *Gettysburg Address*. See LITERATURE.

Orato'rio, a sacred musical composition, to be performed with full orchestral, and sometimes organ, accompaniment, the subjects being generally taken from Scripture. Its origin has

been usually fixed at about the year 1540, its chief object at that time being to render religious services attractive. Its increasing popularity induced poets of eminence to supply texts for these works. Among the most notable oratorios are *The Messiah*, by Handel; *The Creation and The Seasons*, by Haydn; *Saint Paul and Elijah*, by Mendelssohn, and *Passion According to Saint Matthew*, by Bach.

Orchestra, *or'kes tra*, the space in theaters between the spectators and the stage, appropriated by the Greeks to the chorus and musicians, by the Romans reserved for the senators, and in modern theaters occupied by the musicians. The name is also applied to the part of concert rooms assigned to the vocal and instrumental performers; to the instrumental performers, collectively taken, and to the whole body of instruments upon which the latter play. A modern orchestra, in the last sense, consists of stringed, wind and percussion instruments, in varied proportions, according to the number of performers. This number varies from eight to more than a hundred, with as many as twenty different instruments represented.

Orchids, *or'kidz*, the common name of a family of curious plants, found plentifully in the tropics, but also represented by many species in the temperate regions. There are, in all, several thousand species, some growing naturally in the ground; others upon tree trunks or rocks, seeming to obtain all their nourishment from the air, and a third class growing as parasites upon trees and other plants. Orchids are favorites with gardeners and plant lovers, because of the extraordinary forms of the flowers, the brilliancy of their colors and their pleasing fragrance. There are probably 3000 species now under cultivation, and there are many elegant private and public collections. Single rare specimens have commanded enormous prices, and wealthy people have sent hunters into all parts of the world where orchids abound, in the search for new and rare species. So far, Mexico, Central America and South America have been the most productive of fine specimens.

The flowers are of extremely irregular shape and are either solitary or grouped in spikes or in long, loose clusters. Normally the flowers have three petals, one of which, called the *lip* or *labellum*, is developed in a remarkable manner. In some species this is a long, narrow strip; in others, a broad surface variously cut and fringed, and in still others, a pouch or sack, as in the

common lady's slipper. The purpose of all, however, seems to be to force insects to assist or insure the fertilization of the flower, for in most species it is quite impossible for them to fertilize themselves, and most of them would soon become extinct, were it not for the aid of the insects. Besides the lip, another remarkable organ in the plant in blossom is a spur, in the bottom of which is secreted a honey that attracts insects. In endeavoring to obtain this honey, the insect collects the pollen, which usually grows in sticky masses of definite shape. By the time the insect is ready to visit the next flower, this mass has taken such a position that it is thrust against the pistil. The devices by which insects

are attracted, forced to brush against the pollen and later compelled to rub the pollen against the stigma, furnish a never-ending source of wonder. In the lady's slipper, for instance, the insect is tempted to enter the sack, which it

it may do from any side, but when it tries to leave, the curled edge of the petal and the stiff, slanting hairs prevent it from going out except by the very narrow path which leads by the pollen mass and the pistil. But this is not all. Each species of orchid must be fertilized by an insect which is especially adapted in size and shape to carry the pollen. In fact, nothing in the vegetable kingdom is more wonderful than the strange and characteristic shapes into which the flowers have grown, to adapt themselves to their insect friends, a fact discovered in 1793, and later verified. The lady's slipper, the begonia, the calopogon and several fringed orchids are beautiful specimens found in damp soils in the United States. In the tropics there are many species of air plants which have peculiar foliage, but brilliant and beautiful flowers.

Ord, EDWARD OTHO CRESAP (1818-1883), an American soldier, born at Cumberland, Md. He graduated at West Point, entered the army and as second lieutenant took part in the Seminole War (1839-1842). He performed garrison



ORCHID

service during the Mexican War, and later took part in several indian campaigns and in the capture of John Brown at Harper's Ferry. He became brigadier general of volunteers in 1861, was promoted to be major general and took part in several western campaigns. After a forced retirement, on account of wounds, in 1864, he joined Grant's army in Virginia and was of the greatest service in preventing Lee's escape from Richmond. He was made brigadier general in the regular army, retired in 1880 and by special act of Congress was made major general in 1881.

Ordeal, *or'de al*, an ancient form of trial, to determine guilt or innocence. There were two principal kinds of ordeal, *fire ordeal* and *water ordeal*; the former was confined to persons of high rank, the latter, to the common people. Fire ordeal was performed either by taking in the hand a piece of red-hot iron or by walking barefoot and blindfold over glowing coals or over nine red-hot plowshares, laid lengthwise at unequal distances. If the person escaped unhurt, he was adjudged innocent, otherwise he was condemned as guilty. Water ordeal was performed either by plunging the bare arm to the elbow in boiling water, or by casting the person suspected into a river or pond. If, in the first case, he escaped uninjured, or if, in the second, he sank, he was acquitted. As success or failure, except in a few cases, depended on those who made the requisite preparations, a wide field was opened to deceit and malice. The Chinese still retain the ordeal of fire and water, and various ordeals are practiced among the Hindus and some African tribes.

Orders, RELIGIOUS. See MONACHISM; BENEDICTINES; DOMINICANS; FRANCISCANS.

Ordinance of 1787, a statute adopted by Congress, July 13, 1787, providing a plan of government for the territory northwest of the Ohio River, known as Northwest Territory. The government was placed temporarily in the hands of a governor, a secretary and three judges, who might apply to the territory any law then in force in any of the thirteen states. The legislature was to be organized as soon as there were five thousand free males of "full age" in the district. The ordinance also included six other articles, which constituted its distinctive feature. They granted religious freedom, guaranteed the benefit of the writ of *habeas corpus*, trial by jury and proportionate representation in the legislature, emphasized the necessity for education, forbade slavery and declared that the territory

should always remain a part of the United States. The ordinance has been called the "greatest and most important legislative act in American history." See NORTHWEST TERRITORY.

Ord'nance. See CANNON; ARTILLERY.

Ordovician, or *do vish'an*, **System**, a system of rocks, including the formations between the Cambrian system, below, and the Upper Silurian or Silurian Proper, above. In the older classification this system is called the *Lower Silurian*, and that name is still generally used in the United States. In North America the rocks are especially prominent in New York, where local names have been given a number of the formations, such as the Niagara, the Hudson, the Trenton and the Chazy. Ordovician rocks also occur westward from the Appalachians as far as Minnesota. In general, they follow the V-shaped Laurentian continent of that period. Most of the rocks are marbles and sandstones, and some of them are of considerable economic value. The petroleum in Indiana and Ohio and some of the natural gas found in these regions occur in the Ordovician formations, as do the deposits of zinc and lead ore found in Wisconsin, Illinois and Missouri. See CAMBRIAN SYSTEM; SILURIAN SYSTEM; PALEOZOIC ERA.

Ore, a mineral from which metals can be extracted with profit; in its broadest sense, any mineral which contains a metal in combination with some other substance, such as oxygen, silver or carbon. Metals found free from such combination and exhibiting their natural character are called *native*. Metals are commonly obtained by the crushing of the ore and smelting, either in a blast furnace or an electric furnace. Often the ore is first roasted, then smelted and subjected to chemical processes, as in the case of the extraction of gold and silver from low grade ores.

Oregon, the BEAVER STATE, one of the Pacific states, bounded on the n. by Washington, on the e. by Idaho, on the s. by Nevada and California and on the w. by the Pacific Ocean. Its length from e. to w. is 395 miles, and its average width from n. to s. is 278 miles. The area is 96,699 square miles, of which 1092 square miles are water. Population in 1910, 672,765.

SURFACE AND DRAINAGE. Oregon is crossed from north to south by three ranges of mountains; the Coast Range, from 10 to 30 miles from the coast; the Cascades, nearly parallel with the Coast Range and from 120 to 150

miles inland, and the Blue Mountains, in the eastern part of the state. The Coast Range varies from 1000 to 4000 feet in altitude. The range is irregular, with numerous transverse valleys, but it is broken in only a few places. The Cascades have an extreme height of 7000 feet, with a number of peaks that exceed 10,000 feet. The most prominent of these is Mount Hood, near the northern border, with an altitude of 11,225 feet. Other peaks worthy of mention are Mount McLoughlin and Mount Jefferson. Both these ranges are heavily timbered to the tree line, giving Oregon the most extensive and valuable forests of any state in the Union. Between the Coast Range and the Cascades is a broad, fertile valley, which in the northern part is rolling prairie, watered by the Willamette. The southern part is broken and uneven. This valley is crossed by four spurs of the Cascades, which extend to the Coast Range.

The region east of the Cascades, comprising about two-thirds of the state, consists of a high plateau, with a rolling, uneven surface in the south, and in the north, merging into the Blue Mountains. This plateau is separated into northern and southern slopes by a height of land which extends across the state in an irregular line from the eastern boundary, about midway between the northern and southern borders, and having a somewhat southwesterly trend. The region north of this divide is more undulating than that to the south. In the northeast it is crossed by the Blue Mountains, an irregular range having an altitude of about 7000 feet. Several rivers have cut their way through this range, forming canyons, remarkable for their scenery. That of the Snake River on the northeastern boundary is considered by some a rival of the Grand Canyon of the Colorado. The canyons of the Columbia are also noted for their scenery. In places, cliffs of basalt rise abruptly from the river to the height of several hundred feet. In other places there are beautiful cascades.

The Columbia River, which forms most of the northern boundary, and its largest tributary, the Snake, forming the greater part of the eastern boundary, drain the northern half of the state. The chief tributaries of the Columbia from west eastward are the Willamette, the Deschutes and the John Day. The southeastern part of the state is drained by the Owyhee, which rises in Nevada and flows northward into the Snake. West of the Cascades and south of the Willamette are found the Umpqua and the Illinois, flowing directly into the Pacific. In the south-

ern part of the state are a number of large lakes, some of which extend across the border into California. This region, however, is so far removed from railway lines that it is not generally visited and is but little known, except to those who dwell there.

CLIMATE. Like other Pacific states, Oregon has an east and west, rather than a north and south, climate. Owing to the warm winds of the Pacific, that portion of the state west of the Cascades has a mild and equable climate; in winter the average temperature is 42°, and in summer, about 63°. But east of the Cascades, greater extremes are found. Here the thermometer falls as low as 30° below zero in the severest weather and rises to 110°, or more, in the summer months. The rainfall is more uneven than the temperature. Along the coast it varies from 89 to 114 inches, and in the Willamette valley it is about 51 inches, while east of the Cascades it varies from about 13 inches, in the northern part of the state, to 6½, in the southern; hence, the eastern two-thirds of Oregon has an arid climate, and in most of this region irrigation is necessary for the growing of crops. The reason for this unequal distribution of rain is the position of the Cascades and the prevailing westward winds, the mountain ranges extracting from these winds all their moisture before they pass to the eastern part of the state.

MINERAL RESOURCES. The state contains large deposits of minerals of great variety. In the Blue Mountains are found some of the most valuable gold mines in the country, and their annual output is about \$2,500,000. Silver is also quite extensively mined in this region, and in the southwestern part of the state are found deposits of iron, copper and nickel, while limestone, sandstone and other valuable building material are widely distributed. Bituminous coal and lignite are also found in a number of localities, but the mines have not been extensively worked.

FISHERIES. The fisheries of Oregon give employment to over 8000 people and yield an annual income of about \$4,000,000. The fisheries are confined almost entirely to the salmon fisheries of the Columbia River. The chief center of catching and canning of salmon is Astoria, but Portland and other towns along the Columbia valley are sometimes engaged in the industry. Sturgeon, halibut, oysters and other fish are taken off the coast in paying quantities.

AGRICULTURE. With scarcely an exception, the soil is of an unusual degree of fertility, and wherever water can be obtained, abundant crops are raised. Owing to the varying climatic conditions as to temperature and moisture, there is a great variety of agricultural industries. The valley between the Cascades and the Coast Range is the portion most densely settled, and here nearly all the cleared land is occupied by farms. Large quantities of fruit, walnuts, hops and standard grains are raised, and all kinds of vegetables. Dairying and raising of live stock, including cattle, horses, sheep, goats and pigs, are important occupations. On the sage brush land in the eastern part of the state, immense crops of grain are harvested where the land is irrigated.

MANUFACTURES. The extensive forest regions, containing the largest body of standing merchantable timber of any state in the Union, have made lumbering the chief manufacturing industry of the state. The centers of industry are in the basin of the Columbia River. The largest mills are located at Portland and Astoria, and in the southern end of the Willamette valley, at Eugene and Springfield. Other important manufacturing industries are flouring and grist milling, slaughtering and meat packing, the manufacturing of woolen goods, car construction and repairs and shipbuilding.

TRANSPORTATION AND COMMERCE. The northern and western parts of the state are well supplied with railway facilities, the Northern Pacific and the Oregon Railroad & Navigation Co. lines extending along the entire length of the Columbia River, and the Southern Pacific having two trunk lines through the Willamette valley, south. One continues to California west of the Cascades, and the other, in process of construction, cuts through the Cascades in the middle of the state to continue south to San Francisco. The latter road taps the great undeveloped eastern portion of the state, which contains in its soil untold virgin wealth. Hill and Harriman interests are rapidly pushing their rival lines into this same central and eastern Oregon district, through the famous Des Chutes Canyon. The total railway mileage in the state in 1910 was about 2500 miles. The Columbia River is navigable for the largest ocean vessels to Portland, and for lighter vessels, to The Dalles. The broad estuary of the Columbia affords an excellent land-locked harbor, and land-locked harbors are also found at Tillamook, Newport, Florence and Coos Bay.

The commerce of the state consists of the exportation of fish, wheat, flour, lumber, live stock and fruit, including especially apples, cherries, pears, prunes and peaches, and the importation of manufactured articles and food products.

GOVERNMENT. The legislature consists of a senate, which cannot exceed thirty members, and a house of representatives, which cannot exceed sixty members. The senators are elected for four years, and the representatives for two. The legislature meets every two years. The executive consists of a governor, a secretary of state, a state treasurer, a state printer and a state superintendent of public instruction, each elected for four years. The governor cannot succeed himself. The courts consist of a supreme court of five judges, five circuit courts, each presided over by a circuit judge elected in his own district, and county courts, presided over by county judges elected for four years, who also have probate jurisdiction.

EDUCATION. The state maintains a good system of public schools and has a rapidly increasing fund from the sale of public lands, a liberal grant of which was made to the state by the national government. The state university at Eugene is the head of the school system. A state agricultural college is also located at Corvallis, and a state normal at Monmouth. There are within the state a number of important secondary schools and colleges, maintained by religious denominations. Among these are the Willamette University at Salem; Pacific University at Forest Grove; Mount Angel College at Mount Angel; Albany College at Albany; McMinnville College at McMinnville; Pacific College at Newberg; Dallas College at Dallas; Saint Helen's Hall at Portland; Columbia University and the Reed College, opened in 1911.

INSTITUTIONS. The charitable and penal institutions are located at Salem, and consist of schools for the deaf and the blind, a hospital for the insane, a boys' reform school and the state penitentiary.

CITIES. The chief cities are Salem, the capital; Portland, Astoria and Eugene, each of which is described under its title.

HISTORY. Drake discovered the coast of Oregon in 1579, and two centuries later, in 1778, Captain Cook visited Nootka Sound. In 1792 Vancouver surveyed the entire coast and ascended the Columbia River. Spain claimed the region by exploration dating as far back at 1603, and the United States claimed it by reason of Robert

Gray's voyage of 1788-1789, when he also discovered and named the Columbia River. Astoria was established in 1811 by John Jacob Astor; two years later it was captured by the British, but was restored to the United States in 1818 by a convention establishing a system of joint control. By a treaty in 1828 this arrangement was continued, neither party forfeiting its claim. Americans were clamoring for "fifty-four forty or fight"; the British demanded the region as far south as the Columbia River. The boundary was finally fixed at 49°, by a treaty in 1846. In 1832, settlement by New Englanders began, and in 1848 Oregon became a territory. Eleven years later admission into the Union was granted, with a constitution which forbade slavery but prohibited negroes from entering or living in the state. Oregon has always enjoyed peaceful and continuous prosperity, with the exception of the periods of several indian outbreaks and political controversies. In 1910 full suffrage was granted to women. Consult Barrows' *Oregon*, in the American Commonwealths Series.

Oregon, THE, a famous vessel of the American navy, built in 1891. It gained especial fame for its voyage from San Francisco to Key West during the Spanish-American War in 1898; it traversed sixteen thousand miles between March 14 and May 24, without a single important mishap. Upon arrival at Key West, the vessel was fitted for service in a short time, and in the battle off Santiago on July 3 it took a conspicuous part, under the command of Captain Clark. The *Oregon* has a tonnage of 10,524, is capable of reaching a speed of seventeen knots per hour and is equipped with four 13-inch breech-loading rifles, eight 8-inch breech-loading rifles and four 6-inch rapid-fire guns, in its primary battery, and thirty lighter miscellaneous guns in its secondary battery. Its total cost was about \$3,250,000.

Oregon, UNIVERSITY OF, a state university established by act of the legislature in 1872, and opened at Eugene in 1876. It is organized into a graduate school; a college of literature, science and arts, including in addition to the regular departments, courses preparatory to journalism, law and medicine and a school of commerce; a college of engineering, including civil, electrical, railroad and chemical; a school of education; a summer school; a school of correspondence; a school of music; a school of law and a school of medicine, both in Portland. The institution is co-educational. The faculty

numbers over 100, and there are more than 1200 students enrolled. The library contains 32,000 volumes. Tuition is free to all students.

Oregon City, ORE., the county-seat of Clackamas co., 15 mi. s. e. of Portland, on the Southern Pacific Railroad and at the head of deep water navigation on the Willamette River. The Oregon City Falls, 40 feet high, have a capacity for producing 500,000 horse power, and supply the city of Portland and the adjacent country with electric power and lights, besides power for large paper mills, woolen mills, saw mills and other manufacturing establishments. By means of a canal, boats go up beyond the falls. The city has the House of the Good Shepherd, a theater, a public library and good public and parish schools. Population in 1910, about 4000.

Oregon River. See COLUMBIA RIVER.

Orel, ohr yohl', a city situated on the Oka River, Russia, 168 mi. n. w. of Veronezh. The city has communication by river and canal with the Baltic, Black and Caspian seas and is an important center of grain trade. It also has a number of manufacturing establishments. Population in 1908, 90,740.

O'Rell', MAX (1848-1903), the pen name of a French writer, Paul Blouet. He served during the Franco-German War as a war correspondent, was newspaper correspondent in England and afterward taught school for a time. Later he made a trip to the United States, and he wrote of this journey and his other travels in a series of books, among which are *John Bull and His Island*, *Jonathan and His Continent* and *English Pharisees and French Crocodiles*. His style is bright, humorous and sarcastic, and his pictures are often truthful, although there is no great depth in his judgments.

Orenburg, or en boorg', a city of European Russia, situated on the west bank of the Ural River, important because of its trade with central Asia. The manufactures include soap and tallow. There are also large abattoirs, and considerable meat and other animal products are exported. Population in 1910, 93,600.

Orestes, o res'teez, in Greek mythology, the son of Agamemnon and Clytemnestra. When Agamemnon was killed by Clytemnestra and her lover, Orestes was saved by his sister Electra and sent to the court of his uncle, where he was brought up. On becoming a young man he returned to Mycenae and avenged his father's death by killing both his mother and her lover. For this crime he was relentlessly pursued by the Furies, who drove him in madness from

land to land. At last he was informed by the oracle at Delphi that he would be forgiven if he brought back from Tauris to Greece a statue of Diana. When he arrived in Tauris, he found, as priestess in the temple of Diana there, his sister Iphigenia, and together they returned to their home. See AGAMEMNON; IPHIGENIA.

Organ (Greek, *organon*, an instrument), the grandest of musical instruments. The three essentials of an organ are (1) a chest of compressed air; (2) a set of pipes, producing musical sounds, in communication with this chest; (3) a keyboard, by means of which this communication may be opened or closed at pleasure. The air is forced into the wind chest by means of bellows, which are operated by water power, by electricity or by hand. To the upper part of each wind chest is attached a *sound board*, a contrivance for conveying the wind to any particular pipe or pipes at pleasure, and divided into as many grooves as there are keys. Air is admitted into these grooves by means of valves, or pallets, which are connected with the keys; the transmission of air, and consequently the quality of the tone produced, is regulated by the *register*, or *slide*. The series of pipes above each slide is called a stop. The principal stops of an organ are the *open*, *stopped* and *double diapasons*; the *principal*, *dulciana*, *melodia*, *salicional*, *flute*, *trumpet*, *clarion*, *bassoon*, *oboe* and *vox humana*.

An organ may have several wind chests, filled by the same bellows, and several keyboards, each keyboard and wind chest representing a distinct organ and connected with a separate group of pipes. In the largest instruments these organs are five in number, namely, the *great organ*, the *choir organ*, the *swell organ*, the *solo organ* and the *pedal organ*. The keyboards for the hand are termed *manuals*, that for the feet, the *pedal*. The most common compass of the manuals is from CC to F, four octaves and a half; that of the pedal from CCC to E or F, two and a quarter to two and a half octaves. There are two kinds of organ pipes—*flute* pipes, or *mouth* pipes, and *reed* pipes, of each of which there are several species, the character and quality of their sound depending mainly on the material employed in their manufacture (wood or metal), their shape and their dimensions.

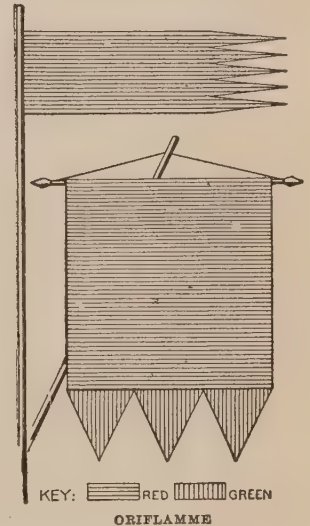
In 1863 a contrivance was patented for transferring some of the work from mechanism to electro-mechanism. An organ built on this principle is termed an *electric organ*. The principal advantages are that it facilitates the

playing and enables the organist to sit at a keyboard at a distance from the instrument. Among the largest organs are those in Saint Peter's in Rome; in the Seville Cathedral; in Haarlem; in Notre Dame, Paris; in the Auditorium, Chicago; in the Mormon Tabernacle, Salt Lake City, and in the Convention Hall, Kansas City.

The instrument known as *harmonium*, *melo-deon* or *reed organ*, is only an organ whose pipes are all reeds and whose bellows are operated by the feet of the performer. There is no pedal keyboard. The pipe organ is probably the offspring of the water organ of the Greeks, and from the fourth century A. D. it has been steadily developed and improved. At first the pipes were played by means of slides withdrawn to admit the air; then levers, similar to those used on railroad switches, were used, and from these came the modern keyboard, though it took many years to produce a practicable one.

Oriflamme, *or'i flam*, until Charles VII's reign, the royal standard of France, originally the banner of the abbey of Saint Denis and its lord protector. When the French kings chose Saint Denis as their patron saint, they made the oriflamme the principal banner of their armies. It was a piece of red taffeta, fixed on a golden spear, in the form of a banner, and cut into three points, each of which was adorned with a tassel of green silk.

Origen or **Origine** (185–254 A. D.), surnamed *Adamentius*, one of the greatest and most influential of the Greek fathers of the Church, born at Alexandria. His father suffered martyrdom at Alexandria in 202, under the emperor Severus, and Origen undertook the support of his mother and six children. His studies were pursued with extraordinary zeal, while he lived an ascetic life. He endured many hardships, left Alexandria to escape the persecution of Caracalla, visited Jerusalem and Caesarea and preached some



eloquent sermons that called forth a rebuke from Demetrius of Alexandria and a call to return home. These persecutions never ceased until the death of Demetrius in 231. In a new persecution, under the emperor Decius, Origen, who was viewed as a pillar of the Church, was thrown into prison, and subjected to the most cruel sufferings, which ultimately resulted in his death. He has been reproached with having attempted to blend the Christian doctrines with the notions of Plato, and, without reason, of favoring materialism. He is credited with some six thousand works, including smaller tracts, but only a few have been transmitted to us, and some of these only in a distorted form. His work against Celsus is considered as the most complete and convincing defense of Christianity of which antiquity can boast. One of his works was the *Hexapla*, but of it we have only fragments. A translation of his extant works into English has been published.

Original, *o ri'j'i nal*, **Pack'age**, in interstate commerce, the package or covering in which goods are shipped. The term has acquired special significance through a series of decisions of the United States Supreme Court, regarding the power of a state to legislate about the sale of articles of interstate commerce. While a state can regulate commerce within itself, the United States Constitution gives to congress the power to regulate commerce between states. Hence a "Prohibition" state can prohibit the sale or manufacture of liquors in the state, but according to the Supreme Court, imported liquors cannot be regulated by the state, until they become a part of the general mass of its property. And furthermore, goods remaining in the original packages in which they are shipped and while in the hands of the importers, are not part of the general property of the receiving state and hence are not within its jurisdiction. According to these decisions, it was easy to sell liquors in the original packages directly to the consumers and thus to avoid state laws. This possibility was extended by liberal interpretation of the term "original package." In 1890 a law was passed by which all liquors become subject to the police powers of a state as soon as they arrive within its boundaries. This limited greatly the application of the "original package" decisions and simplified the enforcement of liquor laws.

Orino'co, a river of South America, one of the three great rivers of that continent. It rises in the Sierra Parima, on the frontiers of Brazil,

flows first west, then north, then east through Venezuela and falls into the Atlantic by numerous mouths. Its length is about 1600 miles. The Orinoco is connected with the Negro River by the Cassiquiare, a natural canal joining the two rivers, and it receives the waters of many considerable tributaries. During the rainy season it floods the vast fields through which it flows. The scenery on its banks is magnificent. Two remarkable rapids, the Maypures and the Atures, occur in the upper part of the Orinoco, but from these the river is navigable to its mouth, about 800 miles.

O'riole, a small, handsome bird of southern Europe, India and Australia. Orioles frequent gardens and groves, avoiding the ground and flying from tree to tree. The *golden oriole* is of a bright golden color, except its wings and part of its tail, which are a rich black. It builds a cup-shaped nest, which it makes firm and warm by lining with wool. In America the name oriole is given to a different bird. See BALTIMORE ORIOLE.

Or'ion, a hero of Greek mythology, about whom various myths are told. The most common of these tells how, for his attempt to carry off Merope, whom he loved, he was blinded by her father, the king of Chios, and sent to wander about the world helpless. Vulcan, however, took pity on him and gave him one of his servants as a guide to conduct him to the sun god, by whom he was restored to sight. Diana, coming upon him while hunting in the forest, fell in love with him, but her brother, Apollo, became very angry at her love for a mortal and often warned her against continuing her favors toward Orion. One day Apollo taunted Diana about her skill with the bow and arrow, and declared that she was not able to strike a certain dark object on the surface of the ocean, which he pointed out to her. Diana shot and struck the object, totally unaware that it was the head of her favorite, Orion, who was bathing in the sea. Inconsolable for his death, she placed him with his dog in the sky, as the constellation which still bears his name. See ORION.

Orion, the most brilliant constellation in the northern sky, seen best in the northeast in winter evenings. By the ancients this constellation was represented by the figure of a man with a sword at his side. The belt is formed by three stars of the second magnitude, and below them are three other stars, in the midst of which occurs a hazy spot. This is not a star, but the great nebula in Orion, which through the telescope

Oriskany

is a magnificent object. The red star which marks the right shoulder of Orion is Betelgeuse, and the blue star at his left foot is Rigel. Both



ORION

are of first magnitude. Between them and above are the three stars that mark the head.

Oris'kany, **BATTLE OF**, a battle fought about two miles west of Oriskany, N. Y., August 6, 1777, between a force of eight hundred Americans, under General Nicholas Herkimer, and about an equal force of Tories and Indians, under Sir John Johnson and the Indian chief, Joseph Brant. The American force was on its way to assist the garrison of Fort Schuyler, but was ambushed in a deep ravine and compelled to fight a long and bloody hand to hand battle. The battle was followed by the retreat of St. Leger, whose forces, weakened by defeat, were in no condition to oppose the fresh troops approaching from the south under Benedict Arnold.

Orizaba, *o re thah'ba*, a town of Mexico, in the State of Vera Cruz, 70 mi. w. s. w. of Vera Cruz, on the railway which connects the latter city with Mexico. It lies in a fertile valley, about 4090 feet above sea level, and is a rapidly improving trade center. Tobacco grown in the neighborhood is extensively manufactured, and there are manufactures of leather and cotton and woolen cloths. In its vicinity is the extinct volcano of Orizaba, or Citlaltepétl. Population in 1910, 32,894.

Ork'ney Islands, a group of islands off the north coast of Scotland, from which they are separated by a channel called the Pentland Firth. The area of the islands is about 375 square miles. There are 67 islands and islets,

Orleans

about 30 of which are inhabited. **Pomona**, or **Mainland**, is the largest of the group, and others of the more important are South Ronaldshay, Hoy, Westray, Flotta, Graemsay and Shapinsay. Excepting Hoy, none of the islands has hills of any great height. There are no large streams, but many lakes and springs. The air is moist, but the climate is remarkably mild in winter. Agriculture is not in a very flourishing condition, but oats, barley, potatoes and turnips are raised. Pasturing and fishing are the other chief supports of the inhabitants, the manufactures being limited to hosiery, chiefly hand made. The chief town is Kirkwall, the capital.

It is probable that the Picts originally possessed the Orkney Islands, but in the eighth century, and subsequently, they were occupied by the Northmen. In the ninth century Harold Haarfagr attached them to Norway, and for several centuries they were ruled by jarls, who sometimes owed allegiance to Norway, sometimes to Scotland. About the middle of the thirteenth century they were transferred to Alexander, king of Scotland, but the Norwegians continued to assert their sovereignty. James III of Scotland received the islands as a dowry with Margaret of Norway in 1468, and from that time they have belonged to Scotland. They constitute a Scottish county. Population in 1911, 25,897.

Orleans, *or la ahN'*, a cit^y of France, formerly capital of Orléanais, now capital of the Department of Loiret, is on the right bank of the Loire, 75 mi. s. s. w. of Paris. It has some handsome public squares, a magnificent late-Gothic cathedral from the seventeenth century, two Hotels de Ville, a Palais de Justice and other notable buildings. The house where Joan of Arc lodged is still standing, and it contains an interesting museum of her relics. A bronze statue of the Maid of Orleans is one of the finest sculptural works of the town. The manufactures and trade of the place have declined greatly, but confectionery, pottery and woolen goods are still manufactured. Orléans was built on the site of an ancient Gallic town which was destroyed by Caesar. It was a place of importance under the Merovingian kings and under the early kings of France. In 1428 the city sustained a siege against the English and was relieved by the Maid of Orleans (See **JOAN OF ARC**). It was taken and retaken more than once in 1870 during the Franco-German War. Population in 1911, 72,096.

Orleans

Orleans, a French royal family, two houses of which have occupied the throne of France. On the death of Charles VIII without issue, in 1498, Louis, duke of Orleans, great grandson of their common ancestor Charles V, and grandson of the first duke of Orleans, ascended the throne under the title of Louis XII. Henry III, who died in 1589, was the last sovereign of this house, or the Valois-Orleans branch. For the House of Bourbon-Orleans, see **BOURBON**.

Orleans, **LOUIS PHILIPPE JOSEPH**, Duke of (1747-1793), better known as *Egalité*. His opposition to the court began in 1771, and he became the rallying point of its enemies. In 1787 he was exiled for the part he took in the Assembly of Notables; in 1789 he was one of the nobles who joined the Third Estate, and in 1792 he went over to the revolutionary party without reserve, took the name of *Philippe Egalité* (Philip Equality) and voted for the death of Louis XVI. It did not save him from being arrested as a Bourbon, condemned and beheaded.

Orleans, **MAID OF**. See **JOAN OF ARC**.

Orleans, **PHILIPPE**, Duke of (1640-1701), only brother of Louis XIV of France, and founder of the House of Orléans, which for a short time held the throne of France. In his twenty-first year he married Henrietta Maria of England, sister of Charles II. The great esteem which the king showed for this princess excited the jealousy of his brother, and her sudden death was attributed to poison, to the administration of which the duke was suspected of being accessory. The second marriage of the duke, with Elizabeth of the Palatinate, was arranged by Louis to secure the neutrality of the elector Palatine in the approaching war against Holland. In this war the duke distinguished himself, in spite of his effeminacy.

Orleans, **PHILIPPE**, Duke of (1674-1723), regent of France during the minority of Louis XV. He early came under the influence of the clever and unscrupulous Dubois, who continued his confidant and adviser through life. In 1692 he married Mademoiselle de Blois, the legitimated daughter of Louis XIV. In 1707 he was appointed to succeed the duke of Berwick in Spain, and completed the subjugation of that country, but he was recalled because he was suspected of intriguing for the crown of Spain. On the death of Louis XIV in 1715 he was appointed regent. On acceding to power he found the finances in extreme disorder and endeavored to improve matters by retrenchment and peace;

Orpheus

but his reckless introduction of a vast paper currency brought the nation to the verge of bankruptcy (See **LAW**, **JOHN**). Dubois obtained most of the authority in the government, while the regent gave himself up to a life of dissipation. He resigned the government to Louis XV in 1723.

Ormuz, *or'mooz*, or **Hormuz**, an island in the Persian Gulf, on its north side, near its entrance. It is about 12 miles in circumference, is entirely destitute of vegetation and is of importance only as having been once a great trade center. In the fifteenth, sixteenth and seventeenth centuries, it is said to have had a population of 40,000, and it retained its importance until the early seventeenth century, when it was taken by the English and given to the shah of Persia, who destroyed the chief city and transferred its trade to the mainland.

Ormuzd, the name of the supreme deity of the ancient Persians. According to the doctrine of Zoroaster he was the lord of the universe and the creator of earthly and spiritual life, the source of light, wisdom and intellect and the giver of all good. See **ZOROASTER**.

Ornithology, that branch of zoölogy which treats of birds, their description, habits and relationship to man. See **BIRDS**.

Ornithorhynchus, *or'ni tho rin'kus*. See **DUCK-BILLED PLATYPUS**.

Orontes, *o ron'teez*, a river of Syria, which rises in the Lebanon Mountains, flows northward, then westward and empties into the Mediterranean Sea. Its length is about 200 miles. It is not navigable. The scenery on its banks for part of its course is very beautiful.

Orpheus, *or'fe us*, in the mythology of Greece, a famous musician, by some accounts the son of Apollo, with whom he was usually associated in legend. To him is attributed the application of music to the worship of the gods. Apollo presented him with his lyre, or, according to other accounts, Orpheus invented it himself, and the Muses taught him to use it, so that he moved not the beasts only, but the woods and rocks, with its melody. Having lost his wife Eurydice by the bite of a serpent, he descended into Hades in an attempt to bring her back, and his music so moved the infernal deities, Pluto and Proserpina, that they consented to her return to earth, if her husband, whom she was to follow, would not once look back until they had reached the upper world. This condition the impatient Orpheus violated, and so he lost his wife forever. He is said to have met his death at the

hands of a band of furious women engaged in the mystic rites of Bacchus. Another version says that he was slain by Jupiter because his power of bringing back the dead was not in accord with the laws of nature. His rescue of Eurydice and his death at the hands of the Thracian women were favorite subjects for artists.

Orris Root, the root of several species of iris, especially of the European iris, which, on account of its violet-like smell, is employed in perfumery and in the manufacture of tooth powder. It was formerly used as a medicine.

Orsini, *or se'ne*, one of the most illustrious and powerful families of Italy. It became known about the eleventh century and had already acquired high rank and extensive possessions in the Papal States, when one of its members, Giovanni Gaetano, was raised to the pontificate under the title of Nicholas III (1277-1280). The feud between the Orsini and Colonna families is celebrated in history; it commenced toward the close of the thirteenth century and is distinguished for bitterness, unscrupulousness and violence, assassination being not infrequently resorted to. Many of the Orsini became famous military chiefs. Vincenzo Marco Orsini (Benedict XIII) succeeded Innocent XIII as pope in 1724.

Orsini, FELICE (1819-1858), an Italian revolutionist. In 1838 he was sent to study law at the University of Bologna and joined the Society of Young Italy, formed by Mazzini. In 1843 he took an active part in an insurrection, and, being apprehended along with his father, he was sentenced to the galleys for life. By the amnesty of 1846 he obtained his freedom, but soon after he again engaged in intrigues under Mazzini and took a prominent part in the stirring events of the following years. Forced to flee from the country, he escaped to London, where he wrote his work, *Austrian Dungeons in Italy*, and lived by giving lectures on his adventures. He now planned, in connection with three companions, the assassination of Napoleon III, whom he regarded as the main support of reactionary tendencies in Europe. The attempt was made on January 14, 1858, but was unsuccessful, and Orsini, with one of his companions, was executed.

Orthoceras, *or thos'e ras*, or **Orthocerate**, a genus of mollusks that were very numerous in a past geologic age, their fossils being abundant in the formations extending from the lower Silurian to the Triassic periods. In

structure they resembled the nautilus, except that their shells were straight, instead of curved. The shell was divided into numerous chambers by cross partitions, each of which had a small opening in the center. Some species were small, while others were quite large. The shells of some species found in the Trenton limestone are as large around as a barrel, and the sections found indicate that the animal must have been from twelve to fifteen feet long. In all, about two hundred species have been discovered.

Orthoclase, *or'ho klase*. See FELDSPAR.

Orthoped'ics, a modern branch of medical science, relating to the prevention and cure of natural deformities. Prevention is accomplished in infants and children by hygienic means, such as pure air, careful nursing and suitable food, clothing and exercise. Cures are attempted by means of mechanical treatment, but are liable to be retarded or become impossible unless treatment is begun soon after the deviation from the natural shape begins. In our time the manufacture of orthopedic apparatus has become highly developed and forms an important branch of trade.

Orthop'tera, a large family of insects, in which the young when first hatched from the egg bear a strong resemblance to their parents. They have four wings, the upper tough and somewhat hardened, lying straight along the body, covering the hinder ones, except when in flight. There are about 10,000 species, including such insects as crickets, cockroaches, grasshoppers and katydids, as well as the odd-looking walking sticks, leaf insects and praying mantis. Some species gather in enormous numbers and cause great destruction to vegetation. See INSECTS and special articles on the insects mentioned above.

Ort'ler or **Ortler Spitze**, a mountain of the Alps, in Tyrol, near the borders of Switzerland, the highest peak in Austria-Hungary. Its height is 12,800 feet. The group to which this mountain belongs is known as the Ortler Group.

Or'tolan, a bird related to the buntings, a native of North Africa and southern Europe. Its throat and the spots around its eyes are



ORTOLAN

yellow, its breast and belly, reddish, the upper part of its body, brown, varied with black. Epicures esteem its flesh very highly, and large numbers are caught annually in the south of France, in Italy and in Cyprus, and are fattened for the table.

Oruro, *o roo'ro*, a town of Bolivia, capital of the Department of Oruro, situated on a plain 12,250 feet above sea level. It was formerly of much importance, but many of its finest buildings are in ruins, and its commercial importance has greatly declined. Tin, copper and silver are exported. Population in 1909, 20,670.

Oryx, the name of the genus of antelopes represented by the addax, the gemsbok of South Africa and other species, found in large herds, chiefly in the northern portions of the African continent. The horns are very long, spiral and curved backward.

Osage, *o'sage*, a once important Siouan tribe of indians, now living on a reservation in Oklahoma and enjoying the distinction of being the richest tribe in the United States, as every man, woman and child in the tribe draws an annual income from the United States of not less than \$300. Originally they occupied extensive territory in what are now the states of Missouri, Arkansas and Kansas and were considered a treacherous, faithless people.

Osage, a river which rises in Lyon co., Kansas, flows eastward and after a course of about 500 mi. enters the Missouri River 9 mi. below Jefferson City. It is navigable for small vessels for about 200 miles from its mouth.

Osage Orange, a tree native to North America, especially to the southwestern United States, where it is frequently used as a hedge plant. The wood is yellow, tough and satiny and was formerly much used for bows by the indians. The tree grows to a height of thirty to sixty feet and produces a large, yellow fruit of woody texture, somewhat resembling an orange, but not edible.

Osaka, *o sah'ka*, or **Osaka**, *o zah'ka*, a city of Japan, in the island of Hondo, on the Yodo River and on the shore of Osaka Bay, 37 mi. s. w. of Kyoto, with which it is connected by railway. It is intersected by canals, which are spanned by numerous wooden bridges, and this peculiarity has won for it the name of the "Venice of the East." It has theaters and other places of amusement, many temples and a famous castle. Its chief industries are the manufacture of cotton, glass and iron and steel products, and shipbuilding. There are also

numerous other less important manufactures. Its foreign trade is considerable, although the harbor is not very good and the trade by no means equals that of Kobe or of Yokohama. It commands much of the commerce of the interior. Population in 1908, 1,226,590.

Os'car I (1799-1859), king of Sweden and Norway, son of Charles XIV John. During the reign of his father he was three times viceroy of Norway, where he made himself popular by his just administration. He acceded to the throne in 1844, reformed the civil and military



OSAGE ORANGE
a, fruit; b, sterile flower; c, fertile flower.

administration of the state, abolished primogeniture, established complete liberty of conscience, encouraged education and agriculture and removed the political disabilities of the Jews. He took little part in foreign politics.

Oscar II (1829-1907), king of Sweden and Norway from 1872 to 1905; from the latter date, king of Sweden only. Although he showed himself from the first willing to grant concessions to the Norwegians, he steadily opposed their efforts for independence. Despite his opposition, however, matters came to a crisis in

Osceola

1905, and Norway was lost to him. Oscar was a writer of some merit; he translated Goethe's *Tasso* into Swedish, and published several volumes of lyric poetry.

Osceola, *os e o'la*, (1804-1838), a celebrated indian chief. His father was white; his mother



OSCEOLA

was the daughter of a Creek chief. Osceola became influential with the Seminole, whom he had joined, and soon, as their chief, became the strongest opponent of the whites. His wife, the half-breed daughter of a negro slave, was seized and carried away by the former owner of her mother. This so embittered Osceola that he became one of the most terrible enemies the whites ever had. Imprisonment and punishment did not subdue him, and he took murderous revenge at every opportunity. In October, 1837, while carrying a flag of truce to General Jessup, he was treacherously seized and kept a prisoner in Fort Moultrie until his death.

Ösel, *ö'zel*, or **Oesel**, an island in the Baltic Sea, belonging to the Russian Government of Livonia, situated at the entrance to the Gulf of Riga. Its area is about 1000 square miles. The surface of the island is undulating; the climate is mild, and grains, including wheat, can be produced. Agriculture, the rearing of horses, and fishing are the principal occupations of the inhabitants. Population, estimated at 42,000.

Osh'kosh, Wis., the county-seat of Winnebago co., 80 mi. n. w. of Milwaukee, on Lake

Osiris

Winnebago, at the mouth of the Upper Fox River, and on the Wisconsin Central, the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. A state normal school is located here, and the city has a public library, Saint Mary's Hospital and several parks. Other important buildings are the city hall, the county courthouse and the Federal building. The lake affords fine fishing, yachting and ice boating, and there is good hunting in the vicinity. State and county hospitals for the insane and the county poor farm are near the city. Oshkosh has an important trade in lumber and extensive manufactures of lumber products, such as sash, doors, blinds, matches and furniture. There are also manufactures of machinery, boilers, twine, matting, flour, tobacco, liquors and other articles. The place was settled in 1836 and was chartered in 1853. Four different times during its history it has been greatly damaged by fires. Population in 1910, 33,062.

Osier, *o'zhur*, the name of the willows which are used for making wicker work. The common



OSIER
a, fertile flower.

osier is a European tree, growing in wet grounds, where it is often planted to prevent the washing away of banks. Among the best varieties are the fine basket osier, the green-leaf osier, or ornard, the Spanish rod and the golden osier. Osiers are grown extensively in Holland, Belgium and France, where they form an important commercial product.

Osi'ris, one of the great Egyptian divinities, the brother and husband of Isis and the father of Horus. He was styled the manifestor of good, lord of lords and king of the gods, and he represented the sum of beneficent agencies, as

Set represented evil agencies. Osiris, after having established good laws and institutions throughout Egypt, was murdered by his brother Set and became afterward the judge of the dead. There are a multitude of traditions, both Greek and Egyptian, about Osiris. He is represented under many different forms and is compared sometimes to the sun and sometimes to the Nile. His soul was supposed to animate the sacred bull, Apis, and thus to be continually present among men. His worship extended over Asia Minor, Greece and Rome; the rise of Christianity put an end to it.

Os'kaloo'sa, IOWA, the county-seat of Mahaska co., about 60 mi. s. e. of Des Moines, on the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy and other railroads. The city is in a fertile agricultural and stock-raising district. There are extensive deposits of coal, limestone and clay in the vicinity. The principal industrial establishments are flour and grist mills, brickyards, a large packing house, and wagon, heater and other factories. The city contains the Penn College, Oskaloosa College, a business school and a public library. The annual state meeting of the Society of Friends is held here. The place was settled in 1843, and the city was incorporated in 1853. Population in 1910, 9466.

Osmium, *os'mi um*, a bluish-white metal, with a bright luster, closely related to platinum. It is the heaviest of all substances, being twenty-two and one-half times heavier than water. Osmium is the most infusible of all the metals. It combines with chlorine in different proportions, also with sulphur, and forms alloys with some other metals. Osmic acid acts as a powerful oxidizer, removing the carbon from indigo, separating iodine from potassium iodide and converting alcohol into acetic acid.

Osmo'sis, the name given to the interchange which takes place between liquids when they are separated by a membrane. For instance, if a bladder containing a strong solution of sugar be placed in a receptacle containing water, it will be found after a time that a considerable quantity of water has passed through the membrane into the bladder, making it noticeably fuller. On the other hand, there has been a passage of the denser fluid into the water. The flow from the vessel into the bladder, or the inward flow, is called *endosmosis*, and the flow from the bladder into the passage, or the outward flow, *exosmosis*. The flow is usually unequal, the greater flow being from the light to the denser liquid. When

the fluids become of the same density, osmosis ceases.

Osmosis is one of the most essential processes in the growth of plants. The protoplasm is confined within the cells, the walls of which are a thin membrane. Water and any substances it may hold in solution can pass through this membrane, but the protoplasm has the power of selecting those substances which are needed for its own growth; thus, it absorbs from the circulating cell the necessary nutriment. It is supposed that by this means the circulation of nutritious fluids is maintained in plants, though the subject is not perfectly understood.

Os'nabrück (sometimes called *Osnaburg*), a town of Prussia, in Hanover, capital of the district of Osnabrück, on the Hase, about 74 mi. w. s. w. of Hanover. In the old town there are many interesting buildings, among which are the Catholic Cathedral and the Gothic Church of Saint Mary, which dates from the fifteenth century. It was formerly an important center of linen manufacture. Among the important industries are iron founding, tanning and the manufacture of machinery, boilers, nails, pipes, musical instruments, rugs, cotton goods, paper and brick. Population in 1910, 65,956.

Osprey, *os'pray*. See FISH HAWK.

Os'sining, N. Y., a village in Westchester co., 31 mi. n. of New York City, on the east bank of the Hudson River and on the New York Central railroad. It is a beautiful residence place, located on an elevated site, at the widest point of the Hudson River, known as Tappan Sea. The famous Sing Sing State Prison is located just outside the village. Other features of interest are the arch of the Croton Aqueduct and the arched highway bridge. The village contains foundries, machine shops and manufactures of medicines, shoes, leather and other articles. The place was settled about 1700 and was incorporated as a village in 1813. Until 1901 it was known as Sing Sing, which is an Indian name meaning *stony place*. Population in 1910, 11,480.

Os'soli, SARAH MARGARET FULLER, Marchioness (1810-1850), an American critic, born at Cambridge, Mass. She was remarkably precocious and for this reason was given an education which taxed her strength and permanently injured her health. Through her brilliancy, and especially her conversational powers, she attracted the attention of the most eminent men of New England and became closely associated with the Transcendentalists. For a time she was the editor of their journal, *The Dial*, but

although she was interested in Brook Farm and often visited it, she never became a member of the company there, because she saw the impractical character of the idea. Her first original volume was *Summer on the Lakes*, and she also wrote *Women in the Nineteenth Century*. Her chief contributions to literature, however, were essays on art and literature, published in the *New York Tribune*. She went to Europe in 1846, married in the next year the Marquis d'Ossoli and remained in Rome during the Revolution of 1848, serving in the Roman hospitals during the French siege of 1849. In the next year she embarked with her husband and her son for the United States, but the vessel was wrecked off Fire Island Beach, near New York, and all were drowned. See **TRANSCENDENTALISM**; **BROOK FARM**.

Ostend', a seaport of Belgium, in the Province of West Flanders, on the North Sea, 14 mi. from Bruges. It is one of the most fashionable of European watering places, and in some years as many as 50,000 visitors come to the town during the season. The Kursaal, a magnificent building, is the center of the social life during the season. Cod and herring fishing and the cultivation of oysters are considerable industries. The city was built in the ninth century. It sustained a memorable siege by the Spaniards from 1601 to 1604, when it surrendered to Spinola. In 1914 it was for a short time the capital of Belgium, but was later taken by the Germans. Population in 1911, 42,638.

Ostend Manifesto, a famous dispatch signed at Ostend, October 9, 1854, by James Buchanan, John Y. Mason and Pierre Soulé, at that time United States ministers to Great Britain, France and Spain, respectively. It declared that the purchase of Cuba from Spain by the United States would be highly desirable, but that if Spain refused to sell, the United States should forcibly acquire the island. The meeting of the ministers was at the suggestion of President Pierce, but its results were brought about by the active interest of the pro-slavery party, who desired an extension of territory and who had long been assisting filibustering expeditions to Cuba and others of the West Indies.

Osteopathy, a method of curing disease without drugs. It is based on the assumption that the fluids of the body contain greater or less amounts of every kind of chemical substance and that this store is capable of destroying every disease. The chief cause of disease is the slight displacement of some bone of the

body, which causes an obstruction to the flow of these fluids, or a lack of nervous energy in certain muscles or organs. To cure any disease, therefore, is to locate the disarranged bone or bones, and make the proper adjustment. Andrew Taylor Still, the founder of osteopathy, was a practicing physician and surgeon of the old school, but became dissatisfied with that method of curing. He announced the system in 1875 and practiced it with considerable success. Now there are over 3000 practitioners, with about 1000 students in the various colleges. Twenty-three states have recognized the profession and regulate its practice. The objection made to osteopathy is not so much to the method of curing as to the attempt to adapt it to all kinds of diseases. Many medical schools teach the principles of osteopathy, and a large number of regular physicians use its methods with some classes of patients.

Ostia, an ancient city of Italy, at the mouth of the Tiber, 15 mi. from Rome. It was of great importance as the port of Rome and as a naval station, and for a long period it engrossed the whole trade of Rome by sea. The port, however, was never good, and owing to the gradual accumulation of mud and other deposits brought down by the river, it ultimately became inaccessible to large ships. Many efforts were made by the various Roman emperors to improve the port, but without much success, and the emperor Claudius had a new harbor dug two miles north of the old town of Ostia. The ruins of Ostia comprise tombs, two temples, a theater and a number of other buildings.

Ostracism, *os'tra-siz'm*, (from the Greek word meaning *shell*), a political measure practiced among the ancient Athenians, by which persons considered dangerous to the state were banished by public vote for a term of years (generally ten), with leave to return to the enjoyment of their estates at the end of the period. It takes this name from the shell or tablet on which each person recorded his vote. Among the distinguished persons ostracized were Themistocles, Aristides and Cimon, son of Miltiades. They were afterward recalled.

Ostrich, the largest of the existing birds. It inhabits the plains of Africa and Arabia, but is now found wild only in northern Africa. The full-grown male stands seven or eight feet high and weighs 200 pounds or more. It has a flat head, a stout beak, large eyes and small, useless wings. The neck and thighs are nearly bare, but the body is covered with feathers. The

Ostrich

males are shiny black, with white wings and tails. The females and young birds are of a dull brown color, and when hatched the chicks are striped. The ostrich is a timid bird and has great speed, often outstripping the fleetest horse. The food of the ostrich in the wild state consists of almost anything in the way of herbs, seeds and fruits that can be obtained, but in captivity the birds are usually fed upon alfalfa or some other form of grass or clover, with occasional variations of fruit. In the wild



OSTRICH

state several females accompany one male, and all lay their eggs in the same nest, which is a mere hollow in the sand. In warm countries the eggs are left to be warmed by the sun during the day, and the male bird sits upon them at night, but in captivity, when the birds attain their full growth, which is at about four years, they pair, and each pair is kept in a separate enclosure. Here the nest is made, and about eighteen eggs are laid, upon which the female and male take turns in sitting, the female sitting during the day and the male at night.

Large ostrich farms have been established in the southern part of California, in Arizona, in British South Africa and in other countries where the

Otho

climate is suitable for the raising of these birds, and the industry has proved very profitable. The black and white plumes are obtained from the male bird, and the brown ones from the female. The feathers vary in value, according to size and quality, from a few cents to as high as fifty dollars a plume.

Os'trogoths. See GOTHs.

Oswego, N. Y., the county-seat of Oswego co., 36 mi. n. w. of Syracuse, on Lake Ontario, at the mouth of the Oswego River and at the outlet of the Oswego Canal, and on the Lackawanna, the New York Central and other railroads. The city is on a slight elevation above the lake and has six parks, broad streets and pleasant drives along the river and lake shore. It contains a state normal school, Garritt-Smith Library, a good Federal building, a city hall, a courthouse and a state arsenal. The city has an excellent harbor and conducts a large trade in coal, grain and lumber. There are machine shops, boiler and engine works, a large starch factory, knitting mills and other works. Oswego was established as a military and trading post about 1724 and was chartered as a city in 1848. During King George's War and the French and Indian War, it was regarded as a very important position and was the scene of numerous engagements. Population in 1910, 23,368.

Otho I (called *the Great*) (912-973), emperor of Germany and founder of the Holy Roman Empire. He succeeded his father, Henry I, as king of Germany in 936 and was immediately compelled to go to war to maintain his right to the throne. After a struggle of many years he subdued the duke of Bohemia and gained possession of the duchies of Swabia, Bavaria and Lorraine. In 951 he went to Italy and there was crowned king of the Lombards, and in 962, after his expulsion of Berengar, who had seized upon the territory bestowed upon the pope by Pippin and Charlemagne, he was crowned emperor at Rome. The pope having violated a pledge made to Otho, Otho invaded Italy and deposed the pope, causing Leo VIII to be elected in his place. He was later involved in a war with the Byzantine Empire, which had refused to acknowledge his right to the Empire.

Otho II (955-983), Holy Roman emperor, son of Otho I. His father before his death had him crowned emperor, that his accession to the throne might be unquestioned. Much of Otho's time was spent in Italy, where he suppressed a rising under Crescentius. He attempted to drive the Greeks from Lower Italy,

but the Greeks called the Saracens to their aid, and Otho was defeated in 982. He escaped by leaping into the sea, and was picked up by a Greek ship, from which he contrived to escape. Before his death he had his son Otho crowned as his successor.

Otho III (980-1002), Holy Roman emperor, son of Otho II, whom he succeeded in 983. His mother, his grandmother and his aunt ruled during his minority, but immediately on assuming authority himself, in 996, he showed himself a ruler of much ability. In that year he marched into Italy and crushed a fresh insurrection under Crescentius. On the death of Pope Gregory, Otho placed his old tutor, Gerbert, on the papal throne, as Sylvester II. Peace in Rome was, however, only temporary, and Otho was engaged until his death in putting down disturbances in various parts of Italy.

Otho, MARCUS SALVIUS (32-69), Roman emperor. He joined in Galba's rebellion against Nero and after Galba's accession exercised considerable power and was made consul. Disappointed in his hopes of being chosen Galba's successor, Otho bribed the army, had Galba murdered and was proclaimed emperor in 69. He was acknowledged by the Eastern provinces, but in Germany Vitellius was proclaimed emperor. Vitellius led his army to Rome and defeated Otho, who stabbed himself.

O'tis, ELWELL STEPHEN (1838-1909), an American soldier, born at Frederick, Md. He was taken in infancy to Rochester, N. Y., where he received his education, graduating at the University of Rochester in 1858. He later graduated at Harvard Law School and began the practice of law at Rochester, but in 1862 he enlisted in the Federal army, served throughout the war and became lieutenant colonel, with the brevet rank of brigadier general of volunteers. He remained in the regular army after the war, became successively colonel, brigadier general, major general of volunteers and major general in the regular army (1900). In 1898 he succeeded Major General Merritt as military governor of the Philippines and was a member of the first Philippine Commission in 1899. He returned to the United States in the following year and retired from the army in 1902.

Otis, HARRISON GRAY (1765-1848), an American lawyer and politician, born in Boston and educated at Harvard University. He soon attained a reputation as an able lawyer and eloquent orator and was elected to the legislature and then to Congress, where he took an active

part for a brief period, later filling numerous state offices. He was a prominent figure in the Hartford Convention of 1814 and three years later was elected to the United States senate, where he was a conspicuous opponent of slavery.

Otis, JAMES (1725-1783), an American statesman, born at West Barnstable, Mass., and educated at Harvard University. He practiced law for a time at Plymouth and later at Boston, where he attained a wide reputation. He was elected advocate-general of Massachusetts, but in 1761, when request was made for the issuance of writs of assistance, he resigned and became the leading counsel in opposition, making a notable speech which brought him into active leadership of the patriot party. He added to his reputation by numerous pamphlets against the British policy, especially his *Vindication of the Conduct of the House of Representatives* and *The Rights of the British Colonies Asserted and Proved*. It was at his suggestion that the Stamp Act Congress assembled in 1765, and he was the author of the address sent by it to the House of Commons. He openly defied the royal authorities of the colony and succeeded in checkmating many of their moves against colonial interests. In 1769 he became involved in a dispute with a British officer and received a cut in the head, which resulted in insanity, from which he never fully recovered. He was killed by lightning at Andover.

O'to, a small tribe of Siouan Indians, now living on a reservation in Oklahoma, in conjunction with the Missouri.

Otranto, *o trahn'to*, STRAIT OF, the channel, 40 mi. in width, which connects the Adriatic with the Ionian Sea.

Ot'tawa, an important tribe of Algonquian Indians who occupied the Upper Ottawa River in Canada. They were friends of the French and so were brought into disastrous conflict with the Iroquois and later with the Sioux. They sided with the English against the Americans in the War of 1812. See PONTIAC.

Ottawa, a river in the Dominion of Canada, forming for a considerable part of its length the boundary between the provinces of Quebec and Ontario. It rises in the high land which separates the basin of Hudson Bay from that of the Saint Lawrence, flows first westward, then southward and after a course of about 625 miles discharges into the Saint Lawrence opposite the Isle of Montreal. Six miles above the city begin the Ottawa rapids, which terminate in the Chaudière Falls. The river is navigable for

Ottawa

only about 250 miles, owing to various rapids and cataracts. Immense quantities of timber are floated down the Ottawa from the wooded regions of the interior to the city of Ottawa.

Ottawa, the capital of the Dominion of Canada and of Carleton co., Ont., on the Ottawa River, where it is joined by the Rideau, 101 mi. w. of Montreal, and on the Canadian Pacific, the Canada Atlantic, the Ottawa & New York and other railroads. The Ottawa River, which here forms the magnificent cataract known as the Chaudière Falls, furnishes power for numerous foundries, factories, flour mills and saw mills. The principal trade of the city is in its sawed timber, the total amount cut in the mills being hundreds of millions of feet annually. There are also manufactures of iron ware, agricultural implements, machinery and bricks. The city is located in a region of great beauty and is itself one of the finest cities of Canada. Among the notable buildings are the government buildings on Parliament Hill, the Roman Catholic Cathedral of Notre Dame, Christ Church

Cathedral, Rideau Hall (the residence of the governor-general), the city hall, the postoffice, numerous churches and the public library, or Library of Parliament, which contains over 200,000 volumes. The chief educational institution is the Ottawa Roman Catholic University. The United States consul general is located at Ottawa. The town was first settled in 1823 and was made a city, with its present name, in 1854. In 1858 it was selected as the capital of Canada. Population in 1911, 87,062.

Ottawa, ILL., the county-seat of LaSalle co., about 80 mi. s. w. of Chicago, at the confluence of the Fox and Illinois rivers, on the Illinois & Michigan Canal and on the Chicago, Rock Island & Pacific and the Chicago, Burlington & Quincy railroads. The city has a very beautiful location and is the seat of Pleasant View College and Saint Francis Xavier Academy. It has a

Otter

high school library, Odd Fellows' and Reddick's public libraries, Ryburn Hospital, the Illinois Appellate Court building and four public parks. There are deposits of coal, clay and glass sand in the vicinity, and the city has manufactures of implements, pianos, organs, glass, pottery and other clay products, wagons and various other articles. It was settled about 1830 and was incorporated as a city in 1853. Population in 1910, 9535.

Ottawa, KAN., the county-seat of Franklin co., 40 mi. s. e. of Topeka, on the Marais des Cygnes River and on the Atchison, Topeka & Santa Fé and the Missouri Pacific railroads. Ottawa University is located here, and the city has a Carnegie library, about a score of churches and Forest Park, where the county fair and Chautauqua assemblies are held. The notable



OTTER

buildings include the county courthouse, the First Baptist Church, the First Methodist Church and the Rohrbaugh Theater. There are large nurseries, grain elevators, railroad shops, flour mills, creameries, foundries and other factories, and the city also has a good trade in grain, wool and live stock. The place was founded by John Tecumseh Jones, a missionary to the Indians. Population in 1910, 7650.

Ot'ter, a flesh-eating mammal that frequents the water. Different species are found in various parts of the world, differing in size and in the nature of their fur. They all have large, flattish heads, short ears, webbed toes, crooked nails and tails slightly flattened horizontally. The common *river otter* inhabits the banks of rivers, feeds principally on fish and is often very destructive, particularly to salmon. The under fur is short and woolly, the outer is composed

of longer and coarser hairs of dark brown hue. These otters burrow near the water's edge, line their nest with grass and leaves and produce from four to five young. The *American*, or *Canadian*, otter averages about four feet in length, inclusive of the tail. It is plentiful in Canada and is valuable for its fur, which is a deep reddish-brown in winter and blackish-brown in summer. The sea otters, represented typically by the *great sea otter*, inhabit the coasts of the North Pacific Ocean, but are of comparatively rare occurrence. The tail is short, measuring about seven inches. Their valuable fur is soft and of a deep, lustrous black, or of a dark maroon color when dressed. In general appearance the sea otter somewhat resembles a small seal. In China, otters are sometimes partially domesticated and taught to fish for their masters.

Ot'to I (1815-1867), king of Greece, son of Louis I of Bavaria. He was elected king of Greece in 1832, and for three years the power was exercised by a regency. A revolution in 1843 forced Otto to agree to a constitution, but his rule was never popular, and in 1862 insurrections again began. In the following year Otto was obliged to flee, but he never formally abdicated.

Ot'toman Empire. See **TURKEY**.

Ottum'wa, IOWA, the county-seat of Wapello co., is on both banks of the Des Moines River and about 91 mi. from Des Moines and 281 mi. w. of Chicago. The river is here crossed by three substantial iron carriage bridges and two railroad bridges. The Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Wabash and the Chicago, Milwaukee & Saint Paul railroads run through the city. There are numerous coal mines in and around Ottumwa, which furnish an abundance of coal for the railroads and for the shops and factories located here. The manufactories produce agricultural implements, steam boilers and miners' tools. The city has a public library and a United States government building. Ottumwa was settled in 1849 and incorporated in 1851. Population in 1910, 22,012.

Ouachita, *wosh'i ta*, **River.** See **WASHITA RIVER**.

Oudh, *owd*, a region of British India, forming part of the United Provinces of Agra and Oudh. It lies south of the Himalayas and north of the Ganges, and its area is about 25,000 square miles. It is a vast alluvial plain, watered by the Ganges and its tributaries, of which the most important are the Gogra and the Gumti. It is

for the most part highly fertile, and wheat, rice, barley, sugar, indigo, opium and tobacco are raised in large quantities. Oudh, formerly a Mogul province, became in the eighteenth century an independent state under a Mohammedan dynasty. In 1856 complaints of the misgovernment of the princes of Oudh led to the annexation of the country to British territory. This measure, however, produced much dissatisfaction, and when, in 1857, the Sepoy Mutiny broke out, most of the Oudh Sepoys joined it, and the siege of Lucknow resulted. Lucknow is the capital of the province and the main center of population and manufactures (See **LUCKNOW**). Population in 1911, 12,558,004.

Ouida, *we'dah*. See **RAMÉE**, LOUISE DE LA.

Ounce (Latin, *uncia*, a twelfth part of any magnitude), in Troy weight, the twelfth part of a pound, containing 480 grains; in avoirdupois weight, the sixteenth part of a pound, containing 437½ grains Troy.

Ounce, also called *snow leopard*, a carnivorous animal, found in North Africa, Arabia, Persia, India and China, resembling the leopard, but having longer, coarser hair, more bushy tail and a darker color. It is found particularly in rocky regions, and feeds on goats, sheep and other mammals. In some places it is trained to hunt, like the cheetah. The name is often misapplied to the South American jaguar.

Ouro Preto, *o'ro pra'to*, a town of Brazil, formerly the capital of the State of Minas Geraes, 200 mi. n. of Rio de Janeiro, with which it is connected by rail. It was formerly one of the great mining centers of Brazil, but its gold mines are now nearly exhausted. It has cotton and other manufactures. Population, about 13,000.

Ouse, *ooz*, a river of Yorkshire, England, formed by the junction of the Swale and the Ure. It flows southeast past York and Selby and joins the Trent to form the Humber. Its total length is 130 miles, for about 45 of which it is navigable.

Ouse, **GREAT**, a river of England which rises near Brackley, flows in a general northeasterly direction and falls into the Wash at King's Lynn. Its length is about 160 miles, and it is navigable for about 100 miles.

Outram, *oo'tram*, **JAMES**, Sir (1803-1863), a British soldier and statesman, born in Derbyshire and educated at Aberdeen. He went to India and in 1828 was selected to undertake a mission to the wild hill tribes of the Bombay presidency, a task in which he acquitted himself with credit. As adjutant to Lord Keane, he

took part in the Afghan War of 1839, and distinguished himself at the capture of Khelat and by his dangerous ride through the enemy's country. From that time to his death he was conspicuous in Indian affairs. During the Indian Mutiny, although of higher rank than Havelock, whom he joined with reinforcements at Cawnpore in September, 1857, he fought under Havelock till Lucknow was relieved by Sir Colin Campbell.

Ouzel, oo'z'l, the name given to several birds. The *common*, or *ring*, ouzel of Europe is a bird of the thrush family, marked by a crescent-shaped patch or stripe of white across its breast. The name ouzel was in ancient times given to the blackbird. For the American water ouzel, see DIPPER.

Ovamos, o vahm'poze, black tribes of the Bantu group of Southwest Africa, occupying the exceedingly fertile country which lies south of the Cunene River. The men, who resemble the Kaffirs and Damaras in feature and form, are peaceful and intelligent, living in rude conical huts, cultivating the soil and herding cattle. Cattle form the wealth of the Ovampo tribes, each of which has its own hereditary chief.

Oven, uv'en, *Bird*, the common name of a thrush which builds nests roofed over something like an oven. This bird nests commonly in northern parts of the United States. A genus of small South American creepers which build oven-shaped nests is also given the same name.

Overshot Wheel, a wheel driven by water shot over from the top. The buckets of the wheel receive the water as nearly as possible at the top and retain it until they approach the lowest point of the descent. The water acts principally by its gravity, though some effect is of course due to the velocity with which it arrives. See WATER WHEELS.

Ovid (43 B. C.—18 A. D.), the common designation of Publius Ovidius Naso, a celebrated Roman poet. He received a careful education, which was completed at Athens, where he gained a thorough knowledge of the Greek language. He afterward traveled in Asia and Sicily. Till his fiftieth year he continued to reside in Rome, enjoying the friendship of a large circle of distinguished men. By an edict of Augustus, however, in 8 A. D., he was commanded to leave Rome for Tomi, a town on the inhospitable shores of the Black Sea, near the delta of the Danube. It is impossible now to come to any certain conclusion as to the cause of this banishment, that given in the edict—the

publication of the *Art of Love*—being merely a pretext, as the poem had been in circulation ten years previously. Ovid died at Tomi. His works include, among others, love elegies, letters of heroines to their lovers or husbands, *Art of Love*, *Love Remedies* and *The Metamorphoses*, his best-known work. Ovid's poetry shows no depth of thought and little genuine feeling, but is attractive by reason of its musical qualities.

Owatonna, MINN., the county-seat of Steel co., 65 mi. s. of Saint Paul, on the Straight River and on the Chicago & Northwestern, the Chicago, Rock Island & Pacific and other railroads. The city is in an agricultural region, producing corn, wheat and nursery stock. Owatonna contains creameries, flour mills, foundries, machine shops and automobile, carriage, engine and other factories. There are three parks and many fine private residences, while the principal public buildings are the courthouse, the opera house, the public library and a hospital. The city also contains the state school for dependent children, Pillsbury Academy and the Sacred Heart Academy. It was settled in 1853 and was incorporated ten years later. Population in 1910, 5658.

Owego, N. Y., the county-seat of Tioga co., 21 mi. w. of Binghamton, on the Susquehanna River, at the mouth of the Owego Creek, and on the Erie, the Delaware, Lackawanna & Western and other railroads. The village is an attractive residence place and has become a popular summer resort. It has the Owego Free Academy, Coburn Library, and a fine courthouse. There are bridge works, glove factories, wagon works, saddleries and other factories, and the village has a considerable trade in farm produce and lumber. It was settled on the site of a small indian village about 1786 and was incorporated in 1827. Population in 1910, 4633.

Owen, ROBERT (1771–1858), an English social reformer, born in Wales. He was at the head of a company which bought large cotton mills at New Lanark in Wales, and the reforms which he introduced in the community made him famous throughout Europe. He believed in thorough coöperation and attempted several times to found communities based on this idea. In 1824 he visited America and founded a community at New Harmony, Ind., which, however, proved unsuccessful.

Owensboro, o'enz bur o, KY., the county-seat of Daviess co., 112 mi. s. w. of Louisville, on the

Owen Sound

Ohio River, and on the Louisville & Nashville, the Illinois Central and other railroads. The city is in a farming and stock-raising country, containing valuable timber and deposits of oil, coal, clay, stone, iron and other ores. It has about fifty manufacturing establishments, including tobacco factories, woolen, flour and planing mills, a large cellulose factory and various other works. The Owensboro Female College and the Saint Joseph Francis Academy are located here. The city has more than a score of churches, eight banks, electric street railways, waterworks, electric light plant and Hickman Park. It was settled as Yellow Banks in 1798, was made the county-seat in 1815 and was given its present name in honor of Colonel Abraham Owen in 1818. Population in 1910, 16,011.

Owen Sound, formerly *Sydenham*, a town of Ontario, Canada, the capital of Grey co., and the port of entry on Georgian Bay, at the mouth of the river Sydenham. It is on the Canadian Pacific and the Grand Trunk railroads, 99 mi. n.w. of Toronto. Among its more notable buildings are the townhall, the courthouse and the high school. Its harbor is excellent and can be entered by vessels of the largest capacity. Population in 1911, 12,558.

Owl, a bird of prey that feeds principally during the night. There are several different species which vary greatly in size and in habits. They all have thick, short bodies, very strong wings, large heads and large eyes, usually surrounded by circles of radiating feathers, which, with the rather dignified movements of the birds, give them an appearance of wisdom that is not wholly justified. The plumage is soft and downy, and their flight is almost noiseless. Their legs, and even their toes, are usually feathered, though in some species they are bare. The toes are so arranged that they can be used like hands for claspings. During the day owls spend their time in crevices of rocks, nooks and crannies of old buildings or hollows of trees, and in such positions they nest, laying from two to five white eggs. When disturbed or wounded, some of them fight fiercely. The *great horned owl* of the United States measures five feet or more from tip to tip of its wings and is usually brown in color, though it varies sometimes to almost white. It is common in most parts of North and South America. Sometimes it is a noisy bird at night, with its loud hooting, but when in search of prey it is so quiet and rapid in its movements that it causes no little destruction

Owosso

among the small wild animals and even among domestic fowls. The *screech owl*, or *barn owl*, is perhaps the most common species in the Eastern United States. It is a small, harmless bird, best known by its shrill, unpleasant cry. In the Western United States a little burrowing owl lives in the homes of the prairie dogs, often in company with rattlesnakes, and it is supposed



SCREECH OWL



GREAT HORNED OWL

that the owls and snakes prey upon the young of the prairie dogs. The *snowy owls* are large and handsome birds, with pure white plumage. They hunt by day and are vigorous and fearless in their attacks on birds as large, often, as ducks and partridges. They are found in the cold regions of both hemispheres. The *long-eared owl* appears in the woods of both hemispheres, and the *short-eared owl*, living in more open places, is also found over a very wide territory. In Europe there are a number of well-known species. The "little owl," the one most commonly mentioned in literature, is the one whose note is *to-whit, to-who*. This, too, is the bird that was sacred to Minerva and is still regarded as the symbol of wisdom. In olden times, owls were considered to be birds of ill omen, and they are still regarded by ignorant people with some superstition.

Owos'so, MICH., a city in Shiawassee co., 30 mi. n. e. of Lansing, on the Shiawassee River and on the Grand Trunk, the Michigan Central and other railroads. It is in an agricultural region and contains manufactures of furniture, caskets, screen doors and windows, cars, beet

sugar and various other products. The city has a business college, eight churches and three banks, and it owns and operates the waterworks. It was settled in 1836 and was chartered as a city in 1859. Population in 1910, 9639.

Ox. See CATTLE.

Oxalic Acid, an acid which occurs, combined sometimes with potassium or sodium, at other times with calcium, in wood sorrel and other plants and in minute quantities in the fluids and tissues of the animal body. Many processes of oxidation of organic bodies produce this substance. Thus, sugar, starch and cellulose yield oxalic acid when fused with caustic potash or when treated with strong nitric acid. Oxalic acid is a solid substance which crystallizes in four-sided prisms, the sides of which are alternately broad and narrow, and the summits, two-sided. They are efflorescent in dry air, but attract a little humidity if it be damp. They are soluble in water, and their acidity is so great that, when they are dissolved in 3600 times their weight of water, the solution reddens litmus paper and is acid to the taste. Oxalic acid is used chiefly in certain styles of calico printing, for whitening leather, as in boot tops, and for removing ink and iron mold from wood and linen. It is a violent poison. *Oxalates* are compounds of oxalic acid with bases; one of them, binoxalate of potash, is well known as salts of sorrel or salts of lemon. The oxalate of lime is an important agent in medicine.

Oxalis, a little plant of the warm and temperate climates, which flourishes particularly in North America and at the Cape of Good Hope. The leaves of most species are three-lobed and have a distinct sour taste, by which the plants may be easily recognized. The *wood sorrel*, which is very common throughout most parts of North America, is a delicate little plant, with white or pinkish flowers. Another species nearly allied to this has yellow flowers.

Oxenstierna or **Oxenstjerna**, *ok'sen shair'-na*, AXEL, Count (1583-1654), a Swedish statesman, born at Fänö, in Upland, and educated at Rostock, Jena and Wittenberg. In 1603, after visiting most of the German courts, he returned to Sweden and entered the service of Charles IX. In 1608 he was admitted into the Senate; and on the accession of Gustavus Adolphus, he was made chancellor. He accompanied Gustavus Adolphus during his campaigns in Germany, taking charge of all diplomatic affairs; and on the fall of his master at Lützen (1632), he was recognized as the head of the Protestant League.

This league was held together and supported solely by his influence and wisdom. In 1636 he returned to Sweden after an absence of ten years, laid down his extraordinary powers and took his seat in the Senate, as chancellor of the kingdom and one of the five guardians of the queen. In 1645 he assisted in the negotiations with Denmark, and on his return he was created count by Queen Christina, whose determination to abdicate the crown he strongly opposed.

Oxford, a city and Parliamentary borough of England, county-seat of Oxfordshire, at the junction of the Thames, here called the Isis, and the Cherwell, 55 mi. w. n. w. of London. It is built on a low plain, surrounded by hills, and is a very beautiful city. High street, the principal street, on which stand several of the colleges of the University of Oxford, is one of the finest streets of all England. The oldest building is the castle keep, built in the time of William the Conqueror. Besides the university buildings (See OXFORD UNIVERSITY), the most interesting structures of the town are the municipal buildings, the prison and Saint Mary's, Saint Michael's and Saint Peter's churches. All about the city are beautiful suburbs. Oxford is first mentioned in history in the early years of the tenth century, although it is known that it was in existence somewhat earlier than this. During the Middle Ages it was of considerable importance, and one of the famous occurrences in its history was the assembling in 1258 of the parliament which passed the Provisions of Oxford. The university probably came into existence about the twelfth century, and its growth was steady. During the struggle of Charles I with Parliament, Oxford was the center of the Royalist movement. Although the city was besieged by the army of Parliament, it was not bombarded, and thus its famous buildings escaped destruction. Population in 1911, 53,048.

Oxford Movement. See TRACTARIANISM.

Oxford University, the oldest and most famous English university, located at Oxford, England. The exact date of its founding is not known, but it was probably established early in the twelfth century. The earliest known public document which applies the title of university to the schools of Oxford dates from 1201. The university is a federation of colleges, which were the outgrowth of bands of students gathering together in houses. Sums of money were bequeathed to the university for the erection of buildings and otherwise facilitating study. The

first sum for the endowment of chairs or maintaining *masters* was given in 1249, and during the thirteenth century three colleges were founded by separate gifts. By the beginning of the fourteenth century, three other colleges were added, as well as a number of halls, which were merely residences for students and teachers. The system of colleges established at Oxford, and also at Cambridge University, has been continued to the present time and forms a unique organization, which applies only to these two institutions among all the English universities. Oxford now includes Saint Edmund's Hall, and the following colleges for men: University, Balliol, Merton, Exeter, Oriel, Queen's, New, Lincoln, All Souls', Magdalen, Brasenose, Corpus Christi, Christ Church, Trinity, Saint John's, Jesus, Wadham, Pembroke, Worcester, Hartford and Keble. It also has four colleges for women, namely, Somerville, Lady Margaret, Saint Hugh's and Saint Hilda's Halls; but degrees are not conferred upon women.

The constitution provides for the corporation and establishes a board of control for the affairs pertaining to the interests of the university as a whole. It also provides for the organization of each college under a board of control which has jurisdiction over its own affairs. The legislative and executive bodies are the House of Convocation, the House of Congregation, the University of Oxford and the Hebdomadal Council. The Hebdomadal Council is composed of the vice-chancellor, the retiring vice-chancellor, the proctors and eighteen members elected by the congregation, six of whom must be heads of colleges, six professors of colleges and six members of the convocation of at least five years' standing. All legislative measures must originate in the Hebdomadal Council. The executive board is styled the *Chancellor, Masters and Scholars of the University of Oxford*, and includes the chancellor, the high steward, the vice-chancellor, the proctors, the clerks of the market, the keepers of archives and the registrar. The chancellor and high steward are honorary officials. The vice-chancellor is elected from heads of the colleges and serves for four years. He is the executive head of the university. The discipline is in the hands of proctors.

The curriculum of the university embraces a wide range of subjects, including nearly all branches of knowledge, and all degrees of collegiate rank are conferred. The conferring of degrees is based upon examinations, all of

which are in charge of the university and not the colleges. The greatest possible freedom is allowed in the pursuit of subjects and in instruction, most of which is in the form of lectures, and each student is at liberty to choose the subjects he prefers. Oxford is of especial interest to the United States, because of the provision in the will of Cecil Rhodes, by virtue of which two students from every state and territory are given support, to the amount of \$1500 a year each, for completing courses in the university. See RHODES SCHOLARSHIPS.

Ox'us, the old name of the Amu River. See AMU.

Oxygen, *oks'i jen*, a gas, the most widely distributed of all the elements. By weight, eight-ninths of water, one-fourth of air and about one-half of silica, chalk and alumina consist of oxygen. It enters into the constitution of nearly all the important rocks and minerals; it exists in the tissues and blood of animals. Without it we could not live, and by its agency disintegration of the animal frame is carried on after death. All processes of respiration are carried on through the agency of oxygen, and all ordinary processes of burning and of producing light are possible only in the presence of this gas. Oxygen was first isolated in 1774 by Joseph Priestley, who gave to the new gas which he had discovered the name of *dephlogisticated air*. Lavoisier, the year following Priestley's discovery, put forward the opinion that the new gas was identical with the substance which exists in common air and gave it the name of oxygen—from the Greek *oxys*, acid, and the root *gen*, to produce—because he supposed that it was present as the active constituent in all acids. Modern experiments, however, prove that it is not necessary in all cases to acidity or combustion.

Oxygen is invisible, inodorous and tasteless; it is the least refractive, but the most magnetic of all the gases. It is 1.1056 times heavier than air and is soluble in water to the extent of about three volumes in 100 volumes of water at ordinary temperatures. Oxygen was liquefied for the first time in 1877 by the application of intense cold and pressure; it has even been solidified. It is possessed of very marked chemical activity, having a powerful attraction for most of the simple substances, the act of combining with which is called oxidation. Some substances when brought into contact with this gas unite with it so violently as to produce light and heat; in other cases oxidation is much more gradual, as in the rusting of metals.

Oxygenated Water

The presence of oxygen is, so far as we know, one of the physical conditions of life. In inspiring we receive into the lungs a supply of oxygen; this oxygen is carried by the blood to the various parts of the body and is there deposited to do its work of tissue forming. The deoxygenated blood returns to the lungs and again receives a fresh supply of the necessary oxygen. In medicine, oxygen is administered in its gaseous form in the later stages of pneumonia, in bronchitis, in wasting diseases and in cases of asphyxiation. Water charged with oxygen is administered in cases of dyspepsia or headache, as well as in other diseases. Trees and plants evolve oxygen, which is formed by the decomposition of the carbonic acid absorbed by the leaves from the atmosphere. This is due to the action of the sun's rays and the chlorophyll, or green coloring matter, of the leaves. When oxygen unites with another element, the product is called an *oxide*. The oxides form a most important series of chemical compounds. Oxygen exists also in a peculiar form different from that of the ordinary gas (See OZONE).

Oxygenated, *oks'i jen a'ted*, **Water**. See HYDROGEN DIOXIDE.

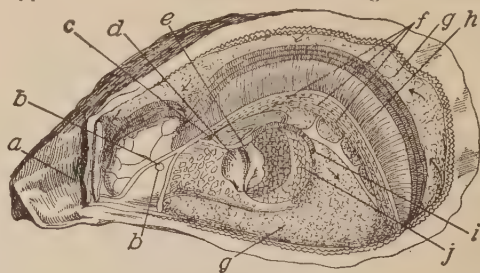
Oxyhy'drogen Blowpipe, an apparatus for burning hydrogen in oxygen. An intensely hot flame is created, in which a steel watch spring will burn with brilliant sparkling explosions.

Oxyhydrogen Light. See LIME LIGHT.

Oyama, *o yah'mah*, IWAO, Marquis (1842-), field marshal of the Japanese army. He was born in Satsuma, and during his youth had for a tutor Saigo Nanshu, a relative, one of the greatest military geniuses of Japan. In the Japanese war of restoration, in 1868, when the forces of the emperor fought against those of the Shogun for the restoration of the sovereign power to the emperor, Oyama fought under Saigo for the emperor, but in the civil war some ten years later, when Saigo, with other Satsuma men, revolted against the emperor, Oyama stayed with the imperial forces, and at the head of a division of troops he succeeded by brilliant skill and courage in bringing victory to the army of the emperor. His later positions were chief of police, associate minister of the interior, vice-minister of war and minister of war. In 1884 he was appointed chief of the general staff, and in the war between China and Japan he was in command of the second army. In the Russo-Japanese War, Oyama won distinction and gave evidence of great strategical and engineering genius.

Oyster

Oyster, a salt-water mollusk, highly esteemed as an article of food (See MOLLUSCA). The oyster is distinguished by a rough shell of two valves, the under one being larger than the upper. It has no mouth; but a fringed mantle,



ANATOMY OF THE OYSTER

- | | |
|--|--|
| a-Hinge. | g-Mantle (arrows show direction of current produced by cilia). |
| b-Ganglia of the nervous system. | h-Gills. |
| c-Blood-vessel from gills to auricle of heart. | i-Outline of organ of Bojanus, the so-called kidney. |
| d-Ventricle. | j-Adductor muscle. |
| e-Auricle. | |
| f-Pores from which water issues into bronchial canals after passing through gills. | |

which extends along the entire opening of the shell, serves to collect food, which is assimilated in a central stomach. The valves of the shell are held together by a strong muscle, whose point of attachment is indicated by the deep blue mark found on the inside of the shell. Oysters are propagated by eggs or spawns. The eggs are so minute that they appear like a milky fluid in the water. The young oysters are for a time able to move about, but as they develop, they attach themselves to some hard, smooth object, where they remain during life. A number attach themselves to one another, forming quite large masses, with distorted shells. The oyster is found in the Atlantic, off the coasts of America and Europe, in temperate latitudes. It prefers rather shallow water, with a smooth, sloping bed of gravel or mud, in a location where the tide washes in upon it such substances as constitute its food.

Because of their delicate flavor and nutritive qualities, oysters are highly valued as food. In the United States oyster fishing is an important industry in Chesapeake Bay, where the oysters are found in largest numbers, and at various other places along the Atlantic coast as far north as Maine. The natural beds have been nearly exhausted, and *oyster farming*, or oyster culture, is now a well-established occupation in many localities. A suitable place for a bed is selected and cleared of rocks or other objects which would interfere with the growth and gathering

Oyster Catcher

of the oysters. This is then marked by buoys and stocked with seed obtained from other beds. After stocking, the bed requires very little attention. The oysters attain their growth in about three years. They are usually obtained by dredging, which consists of dragging the bed with an iron rake that detaches the oysters from the bottom and collects them.

Oysters are placed on the market in the shell, in bulk and in cans. The canning is usually done near the place where the oysters are grown. Bulk oysters are taken from the shell immediately after they are drawn from the water and are shipped in pails containing ice. When shipped in the shell, the shells are packed in boxes of ice, since the oyster must be kept cool or it soon loses its flavor.

Oysters suffer from numerous enemies which prey upon them, especially when young. One of the worst of these pests is the starfish, which fastens upon the oyster, drills a hole through the shell and absorbs its nutriment.

Oyster Catcher, a wading bird, common along the sea coasts of Europe and the rivers of central Africa. It has a peculiar, strong, straight and sharp-edged bill, cut off abruptly at the end. The oyster catchers run, swim and dive with skill and have a strong, rapid flight. Their food consists of mollusks and other sea animals.

Oyster Plant, or **Salsify**, a hardy biennial plant with long fleshy roots, which, when properly cooked, taste like oysters and hence give the plant its popular name. The oyster plant requires a rich soil, which should be well cultivated and manured in the autumn. The main crop is generally sowed in April in rows one foot apart, the plants being set six to eight inches apart.

Ozaka, *o zah'ka*. See OSAKA.

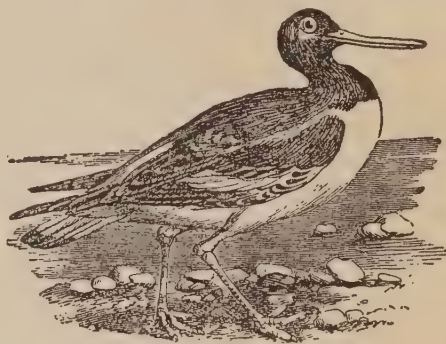
Ozark' Mountains, a group of hills which covers the greater part of southern Missouri and northern Arkansas and extends for some distance into Kansas. The greatest height is not much

Ozone

over 2000 feet, and the average elevation is considerably less than this. The Ouachita Mountains, south of the Arkansas River, are a continuation of the Ozark Mountains.

Ozocerite, *o zo se'rite*, or **Ozokerite**, a fossil resin, of a pleasantly aromatic odor, existing in the bituminous sandstones of the coal measures, occurring chiefly in Galicia, in Austria and in Emery and Uintah counties, Utah. Its color is brown or green, but when purified it forms a hard white wax resembling paraffin, from which excellent candles are manufactured. It is used to some extent in adulterating beeswax.

O'zone, a colorless gas, with an odor resembling that of weak chlorine. It is a modified



OYSTER CATCHER

form of oxygen, in which three volumes of oxygen are condensed to two. Ozone exists in small quantities in pure country air and is produced in various ways. When an electric machine is set in operation or after a discharge of lightning, the peculiar smell of ozone may be noticed. Ozone acts as a very powerful oxidizer; for this reason it is of great service in the atmosphere, as it renders comparatively harmless the dangerous and obnoxious products of animal or vegetable putrefaction. Ozone rapidly bleaches indigo, converting it into a white substance called isatin, which contains more oxygen than the indigo itself.



P, the sixteenth letter in the English alphabet, has varied considerably in form from its Phœnician original, the greatest change taking place in the transition from Greek to Latin, when the short perpendicular limb was bent around to join the longer. In all of these languages, however, it stood for the same sound, which it still retains in English. At the beginning of a few foreign words, as *psalm*, and before *t* in a few words, as *receipt*, *p* is silent. It forms a part of one digraph, *ph*.

The most important use of *P* as an abbreviation is for the Latin *post*, in such expressions as P. M., afternoon, P. S., postscript.

Pachuca, *pa choo'ka*, a city of Mexico, capital of the State of Hidalgo, 55 mi. n. e. of Mexico City. It is situated at a height of more than 8000 feet above the sea, in the midst of a rich silver mining region. The mines in its vicinity are among the richest in Mexico and produce many thousand tons of ore each year. Population in 1910, 38,620.

Pacific Ocean (formerly called, also, the *South Sea*), that immense expanse of water which extends between the North and South American continents and Asia and Australia. It is the largest of the oceans, exceeding in compass the whole of the four continents taken together, and occupying more than a fourth part of the earth's area and fully one-half of its water surface. On the west it extends to the Indian Ocean and has several more or less distinct seas connected with it—China Sea, Yellow Sea, Sea of Japan and Sea of Okhotsk; on the north it communicates with the Arctic Ocean by Bering's Strait, on the south it is bounded by the Antarctic Ocean, and on the east it joins the Atlantic at Cape Horn. Within this enormous circumference it includes the numerous islands composing the groups of Australasia and Polynesia and those adjoining America and Asia. The average depth of the Pacific appears to be greater than that of the Atlantic, and its bed is less irregular. The deepest soundings known are

5155 fathoms (30,930 feet), north of New Zealand, and 5269 fathoms (31,614 feet), off the island of Guam.

In the Pacific the tides never attain the maximum heights for which some parts of the Atlantic and Indian oceans are celebrated. The trade winds of the Pacific are not so regular in their limits as those of the Atlantic, and this irregularity extends over a much wider region in the case of the southeast trade wind than in the case of the northeast. The cause of this is the greater number of islands in the South Pacific Ocean, which, especially in the hot season, disturb the uniformity of atmospheric pressure by local condensations. The northeast trade wind remains the whole year through within the northern hemisphere. The southeast trade wind, on the other hand, advances beyond the equator (See TRADE WINDS). In the Chinese seas the terrible typhoon occasionally rages and may occur at any season of the year (See TYPHOON).

The Portuguese were the first Europeans who entered the Pacific. Balboa, in 1513, discovered it from the summit of the mountains which traverse the Isthmus of Darien. Magellan sailed across it from east to west in 1520-1521. Drake, Tasman, Bering, Anson, Byron, Bougainville, Cook, Vancouver, Lapérouse and others traversed it in different directions in the seventeenth and eighteenth centuries.

Pacific Railroads or Transcontinental Railroads, the name frequently applied to those lines of railway which extend westward from the Mississippi River to the Pacific coast. The first of these to be constructed was the Union Pacific, extending from Omaha to San Francisco, and completed in May, 1869. Other lines in the United States are the Northern Pacific, extending from Saint Paul and Duluth to Portland; the Great Northern, extending from Saint Paul and Duluth to Seattle and traversing a region north of that penetrated by the Northern Pacific; the Atchison, Topeka & Santa Fé, extending from Chicago to San

Paddlefish

Francisco and passing through Kansas, Colorado, New Mexico and Arizona, and the Southern Pacific, sometimes known as the Sunset Route, extending from New Orleans to San Francisco. North of the United States the Canadian Pacific extends from Montreal to Vancouver, and the Grand Trunk Pacific is projected to extend westward through the northern part of Manitoba and across the central parts of Saskatchewan and Alberta, extending to Prince Rupert, on the coast of British Columbia, while a branch extends in a northwest direction to Dawson, Yukon Territory. There are six trunk lines in the United States which extend from Chicago or Mississippi points to the Pacific coast. They are, beginning at the north, the Great Northern, the Northern Pacific, the Chicago, Milwaukee & Puget Sound, the Union Pacific, the Santa Fé and the Southern Pacific. Other lines starting from the same points and connecting with some one of these lines are the Missouri Pacific, the Chicago, Rock Island & Pacific and the Wabash System. See RAILROADS.

Paddlefish, a large fish allied to the sturgeons, so named from the elongated, broad, paddle-shaped nose, with which it stirs up the soft, muddy bottom in search of food. It often reaches a length of from five to six feet. The paddlefishes are exclusively North American in their distribution, being found in the Mississippi, Ohio and other great rivers of that continent.

Paderewski, *pah de ref'ske*, **IGNACE JAN** (1860—), a celebrated pianist, born in Poland. He received his musical education at Warsaw and Berlin and was made professor of music in the Conservatory of Music in Warsaw, at the age of eighteen. At twenty-four he was made professor in the Conservatory of Strassburg. Later he studied in Vienna and began professional tours, upon all of which he aroused the greatest enthusiasm, being considered the foremost of modern pianists. He produced a number of compositions for the piano, and an opera, *Manru*.

Pad'ua, a city of Italy, capital of a province of its own name, 22 mi. w. s. w. of Venice, with which it is connected by rail. It is situated on the Bacchiglione River, which flows through the city in several branches and is crossed by numerous bridges. The houses are lofty, the streets narrow and crooked; and several of them, as well as some of the squares, are lined with medieval arcades. Of recent times the town has been much improved by the opening up of new, and the widening of old, streets.

Paducah

The buildings most deserving of notice are the cathedral, which dates from the sixteenth century; the Palazzo della Ragione; the large, mosque-like Church of San Antonio; the municipal picture gallery; the episcopal palace, and many private palaces. The university was long renowned as the center of law and medicine in Italy and was one of the most famous of European universities. Its students number now less than fifteen hundred.



IGNACE PADEREWSKI

Under the Romans Padua was a flourishing town, and its history is similar to that of most of the cities of Italy after the decline and fall of the Roman Empire. Latterly it was under the rule of Venice, whose fortunes it shared until 1866, when with Venice it became part of the kingdom of Italy. Livy was born at Padua. Population in 1911, 96,230.

Padu'cah, Ky., the county-seat of McCracken co., 80 mi. s. w. of Evansville, Ind., at the confluence of the Ohio and Tennessee rivers, on the Illinois Central and the Nashville, Chattanooga & Saint Louis railroads. The city is in an agricultural, lumbering and mining region and contains over fifty factories. The principal products are cotton rope, tobacco, veneering and other lumber products, wagons, pottery, flour and various other articles. It has railroad shops, and steamboats are also constructed. There are good shipping facilities, both by rail and water, and the city has a very

Paganini

extensive wholesale trade in tobacco, groceries, whisky, queensware, drugs and other goods. There are more than a score of churches, five banks, a business college, Saint Mary's Academy and four newspapers. The principal structures include a fine high school building, a large city hall, a Federal building, a county courthouse and a public library. The place was settled in 1827 and was chartered as a city in 1856. Population in 1910, 22,760.

Paganini, *pah ga ne'ne*, NICCOLO (1784-1840), a celebrated violinist, born at Geneva. His first engagement was in 1805 at Lucca, where he found a patroness in Princess Eliza, Bonaparte's sister. In 1813 he went to Milan and in 1828 he visited Vienna. From this period his fame was world-wide. He was undoubtedly the greatest master of violin technique that ever lived.

Page, DAVID PERKINS (1810-1848), an American educator, born at Epping, N. H. He spent his first years on a farm, during which time he was able occasionally to attend a district school. At eighteen he began teaching in the country schools of New Hampshire and later was appointed associate principal of the Newberry High School, where he remained for twelve years. In 1844 Page was chosen first principal of the state normal school at Albany, N. Y. By his untiring energy, ability and influence, Page brought this school to a high degree of perfection during the four years that he was associated with it. He is best known through his book, *Theory and Practice of Teaching*, which was the first work of the kind produced in the United States and is still one of the best.

Page, THOMAS NELSON (1853-), an American novelist, born in Virginia. He was educated at Washington and Lee University and at the University of Virginia and practiced law in Richmond. Among his writings, the most of which treat sympathetically of life in the South, are *Marse Chan*, his first successful story, published later in a volume called *In Old Virginia; Two Little Confederates; Unc' Edinburg; Red Rock*, and *Gordon Keith*. In 1913 he was appointed ambassador to Italy.

Page, WALTER HINES (1855-), American journalist and diplomatist, born at Cary, North Carolina. He spent four years at Randolph-Macon College, and later two years at Johns Hopkins. He then engaged in newspaper work for twelve years, part of the time as a special writer, for a short time as editorial writer on the *New York World*, and later as editor of a paper

Paine

of his own in Raleigh, N. C. In 1890 he became editor of *The Forum*, which he conducted for five years. He was then in turn literary adviser for a firm of publishers, editor of the *Atlantic Monthly* and editor of *The World's Work*. He became ambassador to Great Britain in 1913.



THOMAS NELSON PAGE

Paging Machine. See NUMBERING MACHINE.

Pago'da, the name given to Hindu and Buddhist temples. The temple proper is generally of pyramidal form, of a number of stories, with curved roof, and embellished with extraordinary splendor. Connected with it may be various other structures, open courts and a gateway, the whole forming architecturally an imposing group. In China the pagoda is not always connected with a temple, but is often a memorial building. Pagodas are also numerous in Burmah, Japan and Siam.

Paine, ROBERT TREAT (1731-1814), an American lawyer, one of the signers of the Declaration of Independence, born in Boston, Mass. He was educated at Harvard University and studied for the ministry, but was admitted to the bar and was a delegate to the provincial and Continental congresses. After the Revolution he held the offices of attorney general of Massachusetts and associate justice of the state supreme court.

Paine, THOMAS (1737-1809), a political and deistical writer, born in England. In 1774 he emigrated to America, with a letter from Frank-

lin, whom he had met in England. Paine threw himself heart and soul into the cause of the colonists, and his pamphlet entitled *Common Sense*, written to recommend the separation of the colonies from Great Britain, and his periodical called *The Crisis*, published during the Revolutionary War, gave him the right to be considered one of the founders of American independence. In 1787 he went to France, where he was well received, and then crossed to England. Here, too, he was given a cordial welcome by Burke and Fox and their party; but despite his friendship with Burke he wrote, in answer to Burke's *Reflections upon the Revolution in France*, the *Rights of Man*, in which he attacked Burke severely. A prosecution was commenced against him for his views on the English Constitution, expressed in the *Rights of Man*, but while the trial was pending he was chosen member of the French National Convention for the Department of Calais, and, making his escape, set off for France, where his *Rights of Man* had gained him great popularity. On the trial of Louis XVI he voted against the sentence of death, proposing his imprisonment during the war and his banishment afterward. This conduct offended the Jacobins, and toward the close of 1793 he was excluded from the Convention, arrested and committed to prison, where he lay for ten months, escaping the guillotine by an accident. Just before his confinement he had finished the first part of his work entitled the *Age of Reason*, which was published in London and Paris in 1794. By the publication of this work, he forfeited the favor of many of his American admirers. He remained in France till August, 1802, and then embarked for America, where he spent the remainder of his life, occupied with financial questions and mechanical inventions.

Painting, the art of representing objects in nature by means of color. Considered in relation to the subjects treated, painting may be divided into decorative; historical; portrait; *genre*, representing scenes of common or domestic life; landscape, with seascape; architectural, and still life, in the last of which are represented inanimate groups, such as vases or fruits. According to the methods employed in the practice of the art, it is termed oil, water color, fresco, tempera or distemper, and enamel painting. Decorative works, usually in fresco or tempera, but sometimes in oil, are generally executed upon the walls, ceilings or other parts

of a building. Up to the fourteenth century ordinary paintings in both oil and tempera were generally made on wood panels, prepared with a coating of size and white, and these are still sparingly employed; but tightly stretched canvas, covered with a priming of size and white lead, is now almost universally adopted for oil painting. For water colors, paper alone is employed.

Oil colors are colors ground with oil, and *water colors* are those wherein gum and glycerine have been used. Both are ground solid, oil being used in the first case and water in the second to thin out the colors when on the palette. Fresco painting is executed on wet plaster. In tempera the colors are mixed with white; in encaustic, wax is the medium employed, and in enamel the colors are fired. Egyptian, Greek and early Roman paintings were executed in tempera; Byzantine art found its chief expression in mosaics, though tempera panels were executed, and early Christian art up to and partly including the fourteenth century adopted this last method. The substance employed in mixing the colors was a mixture of gum and white of egg, or the expressed juice of fig tree shoots. The introduction of oil painting was long attributed to the Van Eycks of Bruges (1380-1441), but painting in oil is known to have been practiced at a much earlier period, and it is now generally held that the invention of the Van Eycks was a drying substance with which to mix or thin their colors.

ANCIENT PERIOD. Painting first comes into historical notice in Egypt in the nineteenth century B. C., but the most flourishing period was between 1400 B. C. and 525 B. C. With the Egyptians the art was the offspring of religion and was, with sculpture, from which it cannot be separated, subordinate to architecture. The paintings are found chiefly on the walls of tombs and temples, but they are also on mummy cases and rolls of papyrus. They consist chiefly of the representation of public events, sacrificial observances and the affairs of everyday life. No attempt was made to imitate nature, and the work was executed according to strict rules, under the supervision of the priesthood. The paintings were usually not flat, but in low relief or slightly sunk. The artists showed no knowledge of perspective, but produced natural and lifelike pictures. The colors used are very simple, but the effect is often harmonious and beautiful.

In Greece, as in Egypt, painting, with sculpture, was subordinate to architecture, and the

friezes, pediments and statues of the temples were originally colored.

Rome never had in ancient times an art that was its own or produced a painter worthy of note. The conquest of Greece by the Romans brought an influx of Greek artists into Italy, and it was by their hands that the principal works of Roman art were produced. A number of specimens of ancient paintings, chiefly in fresco and mosaic, have been discovered in the tombs and baths of Rome, at Pompeii and at other places in Italy. During the first three centuries after Christ, painting under the new influence of Christianity was practiced secretly in the catacombs (See CATACOMBS). But with the establishment of Christianity, by Constantine, as the religion of the state, Christian art was permitted to emerge and was allowed to adorn its own churches in its own way. Later there were many limitations and rigid requirements which fettered the artists, and the result was that art declined, until, with the flood of barbarism which in the seventh century buried Italian civilization, the art of Christian Rome was practically extinguished.

Meanwhile, with the establishment at Byzantium of the Roman capital, in 330 A. D., a Byzantine school of art had been steadily growing. At Byzantium, art had become Christian sooner and more entirely than at Rome. Like the art of ancient Egypt, however, it had grown, under the strict influence of the priesthood, mechanical and conventional, but was yet strong enough to send artists and teachers through southern Europe. All the Byzantine decorations are in mosaic and are noteworthy for the splendor of their gilded backgrounds and for their grandeur of conception, though the figure drawing is weak, with no attempt at pure beauty.

MEDIEVAL PERIOD. In Italy the painters could not at once free themselves from the Byzantine tradition which compelled one painter to follow in the steps of his predecessor without referring to nature; and so this style was carried on in Italy by Byzantine artists and their Italian imitators up to the middle of the thirteenth century. The breaking through of this tradition and the great progress made by the arts in the thirteenth century, form the beginning of a movement which has been termed the Renaissance or Revival (See RENAISSANCE). Three cities of Italy, namely, Siena, Pisa and Florence, share the honors of this revival, each boasting a school, and each possesses two or three great names. The most important of these painters

who showed a marked departure from the Byzantine manner was Giovanni Cimabue, who may be said to be the father of modern painting. Cimabue was the first to give individual life, grace and movement to figures. He made the draperies less rigid and showed a naturalism which was entirely lacking before his time. The style of the Florentine school at this period was somewhat austere and severe, never sensuous. It was the most decorative of all Italian painting. The work of these schools has an earnestness, a devotion and a spiritual significance which will forever make the fourteenth century memorable in the history of art.

EARLY RENAISSANCE. With the fifteenth century came the introduction of oil painting, and with it an all-around improvement, both in knowledge and power of expression. The work of the Van Eycks, Hans Memling and others of the Netherlands shows an excellence in execution and a power of expression not always inferior to the Southern artists. Verrochio, the master of Leonardo da Vinci, promoted a knowledge of anatomy, and Ghirlandajo, the master of Michelangelo, may also be mentioned, both as goldsmith and painter. These painters and others belong to the *Florentine school*, the chief characteristic of which, at this period, was a vigorous naturalism. The *Venetian school* also arose at this time under the influence of Giovanni Bellini and his brother Gentile, whose works, though somewhat hard and somewhat dry in texture, yet in color anticipate the great works of their pupils. The *Umbrian school* is characterized by intense religious sentiment. Illustrative qualities and color are good, but the strength and vigor of the Florentine school is lacking. The Italian art work of the fifteenth century, by its unconscious and spiritual meaning, excelled much of that which was to follow.

SIXTEENTH CENTURY. The interest of the sixteenth century is centered as much upon particular men as upon schools. The four great schools in Italy were at Florence, Rome, Parma and Venice, and each furnished from its scholars a painter who was in himself the particular glory of his school. Heading the Florentine comes Leonardo da Vinci, celebrated as painter, sculptor, architect and engineer. Then followed Michelangelo, combining in himself the highest powers in architecture, sculpture and painting. He was followed in Florence by Fra Bartolommeo and Andrea del Sarto, the best colorist of the Florentine school. The Roman school, a continuation of the Umbrian, centers itself

round the third great name, that of Raphael Santi, aptly called the prince of painters. Parma contains the work of Correggio, generally known as the head of the Lombard school, an artist unrivaled for grace and for harmony of light and shade. Lastly, Venice produced a school supreme in its use of color. Titian, chief of the Venetians, takes rank with the great masters of the Florentine and Roman schools.

In *Germany* the influence of the Flemish school had made itself felt and had produced in Albrecht Dürer of Nuremberg the most celebrated master of his time north of the Alps. Then followed Hans Holbein the younger, the greatest painter Germany ever had, who excelled in pictorial effects and in use of detail, as well as in general effect. In the *Netherlands* Lucas van Leyden stands as the most important painter of the early Dutch school.

SEVENTEENTH CENTURY. With the seventeenth century came the decline, brought about chiefly by the slavish imitation of the great painters of the preceding period. The art of Guido Reni, Albani and Domenichino, representatives of the Bolognese school, begun somewhat earlier by the Caracci, was excellent for its technical qualities, but it was entirely lacking in originality.

In *Flanders* Rubens became the greatest exponent of Italian art. His pictures are especially good for their strength and brilliant coloring. His chief pupil was Van Dyck, noted for his portraits. At this same time there arose also a noted class of *genre* painters, among whom was Teniers the younger. In *Holland* art had attained a distinct individuality in Franz Hals, and to a greater degree in Rembrandt, both portrait painters distinguished for their remarkable groups. Holland, too, is the great exponent of landscape painting, as shown in the work of such men as Van de Velde, Ruysdael and Cuyp, and of *genre* painting, in the naturalism of Gerard Dow and Van Ostade.

Painting in *Spain*, which stands alone in the prevailing religious ascetic character of its productions, reached its greatest epoch in this century, with the realism and religious fervor of Velasquez and Murillo.

Italian influence was very marked in *France* in the seventeenth century. Nicholas Poussin, figure and landscape painter, was one of the greatest painters France can claim. Claude Lorraine and Casper Poussin are painters of landscape, who, though born in France, yet worked in Italy and stand apart from the followers of the na-

tional style, which was coeval with the court of Louis XIV and representative of it, the chief exponents being Le Brun and Mignard.

EIGHTEENTH CENTURY. In *England* the first native painter of note was William Hogarth, who turned directly to nature in his art. He was followed by Sir Joshua Reynolds and by Gainsborough, distinctly original. A school of water-colorists arose at this time, among whom Turner stands preëminent.

NINETEENTH CENTURY. In *France*, David, a painter whose influence made itself felt throughout Europe, was the great reformer. He insisted upon a return to the study of the antique, and his followers number a few distinguished men, notably Gros and Guérin. Géricault, a pupil of Guérin, was the first to break with the extreme classicism of the school of David. Ingres, Delacroix and Delaroche, the last named noted for the reality of his historical subjects and for the tenderness and pathos of his sacred pictures, are the most distinguished names of the more direct and romantic style. Modern French landscape art, founded upon an impulse received from England, has had Decamps, Rousseau, Corot, Millet and Jules Breton as its chief exponents. The work of Regnault illustrates remarkably the tendencies of modern French painting. Bastien-Lepage, with his literal renderings of nature, strongly influences the younger British school; and Meissonier, Gérôme, Bougereau, Constans and Puvis de Chavannes, a decorative artist, are some of the chief members of a school which is at the present time influencing the art of the world.

Germany during the eighteenth century remained stationary in matters of art, but with the revival in France came a similar but slightly later movement in Germany. The chief of the revivalists was Overbeck, and following him came his pupil Cornelius, one of the greatest of modern German painters, whose work is best seen in Munich. Schnorr von Carolsfeld chose for his subjects the medieval history and myths of Germany and also produced an extensive series of illustrations of the Bible. Lessing is famous, both for his historic and landscape pictures. Gabriel Max and Menzel, in historic painting; Knaus Vautier, Metzler and Bochmann, in *genre*, and Achenbach, in landscape, are worthy of note.

Among the best known later artists in *Great Britain* are John Constable, Rossetti, Burne-Jones, William Morris, Leighton, Watts, Millais, Landseer and Alma-Tadema. In *Russia* paint-

ing remained at a standstill long after the Byzantine period, but since 1850 it has made great advances. It has produced Swedomsky, historical painter; Verestchagin, a traveler artist, and Kramsköe, a religious painter.

Until about 1825 the *United States* had followed Great Britain in art, as in literature. Since that time, however, a marked development of individuality and excellence has been apparent. At the French exhibition, the most famous and exclusive of art exhibitions, there was in 1855 no American section; in 1863 a part of a small section was allotted to the United States; in 1878 it had a large exhibit, and in 1900 it furnished the largest exhibit except France and received more honors than any other nation except France. Most American painters complete their education abroad, usually in France; but there are an increasing number of good art schools in the United States, and with the excellent instruction offered in the public schools, they are rapidly cultivating an appreciation of the best in art. Of American painters the following are probably the best known: West, Copley, Stuart, Allston, Bierstadt, Church, Inness, La Farge, Sargent, Vedder, Whistler and Moran. A more comprehensive knowledge of painting may be obtained by reading the biographical articles on the different painters.

Paintings, TWELVE GREAT. The artist-critic W. W. Story has given the following as the twelve greatest paintings in the world: *The Transfiguration*, Raphael, 1519, in the Vatican; *Sistine Madonna*, Raphael, 1518, Dresden Gallery (See RAPHAEL); *Last Judgment*, Michelangelo, 1534-1541, Sistine Chapel; *Communion of Saint Jerome*, Domenichino, 1614, Vatican; *Descent from the Cross*, Rubens, 1612, Antwerp Cathedral; *Descent from the Cross*, Volterra, about 1545, Church of S. S. Trinita de' Monti, Rome; *Last Supper*, Da Vinci, 1498, Santa Maria delle Grazie, Milan (See VINCI, LEONARDO DA); *Assumption of the Virgin*, Titian, 1518, Venetian Academy; *The Night*, Correggio, 1522, Dresden Gallery; *Aurora*, Guido Reni, 1609, Rospigliosi Palace, Rome; *Beatrice Cenci*, Guido Reni, 1509, Barberini Palace; *Immaculate Conception*, Murillo, 1678, Louvre.

Paints, compounds of a coloring substance, mixed with oil, glue or water. The coloring substance is called a *pigment*, and the liquid with which it is mixed, a *vehicle*. To the mixture of pigment and vehicle there is usually added a *drier*, for hardening the painted surface, and a *solvent*, or *thinner*. Turpentine is the best

thinner. The greater number of pigments are minerals, but some, like cochineal, are animal substance, and others, like indigo, are of vegetable origin. In oil paints the pigments are mixed with oil, usually that obtained from flaxseed, and in water colors the pigments are mixed with water. For ordinary house paints, especially for external use, white lead and boiled linseed oil are generally used. The boiling causes the oil to dry quickly when exposed to the air and also protects the pigments from water.

Paisley, *pay's'ly*, a municipal and Parliamentary borough of Scotland, in the County of Renfrew, on the White Cart, 7 mi. w. s. w. of Glasgow. The most noteworthy building is the abbey church, and other buildings of interest are the townhall, the new county building and the Coats Memorial Baptist Church, one of the finest modern buildings in Scotland. Paisley has long been noted for its manufacture of textiles. The shawl manufacture, introduced about the beginning of the nineteenth century and long the most flourishing industry of the town, is now almost extinct, but the textile manufacture is still large. Other manufactures include soap, starch, looms, chemicals and distilled liquors. There are also extensive dyeing, engineering and tanning works. Population in 1911, 84,477.

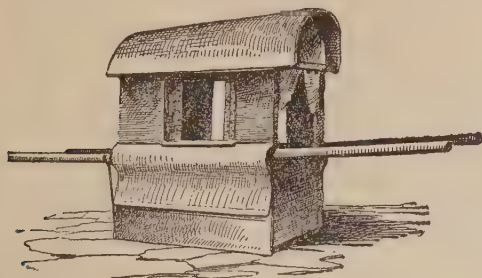
Pak'enham, EDWARD MICHAEL, Sir (1778-1815), an English soldier, born in Ireland. He entered the army and became major general in 1812. He served in the Peninsular War under the Duke of Wellington, winning distinction for his gallantry and success as a leader, and he commanded the British expedition against New Orleans in 1814. He was killed in the battle of January 8, 1815. See NEW ORLEANS, BATTLE OF.

Palais Royal, *pa lay' rwah yahl'*, (French, "royal palace"), a popular resort of the Parisians, originally a royal palace, as the name implies. The palace was built by Richelieu and by him it was presented to Louis XIII. It was confiscated by the Republicans in 1793, and the Tribunal sat in the palace during the Reign of Terror. At the Restoration it was repurchased by the duke of Orleans, but in the revolution of 1848 it was sacked by the mob and again appropriated to the State. In 1871 it was set on fire by the Communists, but it has since been restored. The Théâtre Français and several shops now form parts of the buildings of the Palais Royal.

Palanquin, *pal an keen'*, or **Palankeen**, a covered conveyance, used in India, China and

Palate

other countries of the East. It is a sort of box, about 8 feet long, 4 feet wide and 4 feet high, with wooden shutters of lattice work. It is borne by poles on the shoulders of men and can carry one person, who sits upon a seat. The palanquin is not now extensively used, because in India and other countries where it was formerly employed by Europeans, the building of



PALANQUIN

railways and the improvement of roads have made other means of conveyance more practicable and desirable.

Pal'ate, the name applied to the roof of the mouth. It consists of two portions, the *hard* palate in front, the *soft* palate behind. The former is bounded above by the palatal bones, is lined by mucous membrane and is continuous behind with the soft palate. It supports the tongue in eating, speaking and swallowing. The soft palate is a movable fold, suspended from the border of the hard palate in the back of the mouth. It consists of mucous membranes, nerves and muscles and forms a sort of partition between the mouth and the openings from the nostrils. Its lower border is free and from the middle of it hangs the *uvula*; on each side are two curved folds of mucous membrane, called the *arches*, or *pillars*, of the soft palate. Between these on each side of the pharynx are the two glandular bodies known as *tonsils*. The soft palate comes into action in swallowing and is of great importance in the utterance of certain sounds. The special use of the uvula is not well known. It is often relaxed or enlarged, causing a troublesome cough. Glands, secreting the mucus which lubricates the throat during the passage of food, are abundant in the soft palate. See **TONSILS**.

Palat'inate (German, *Pfalz*), a division of the old German Empire, consisting of two separate parts, distinguished as the Upper Palatinate and the Lower, or Rhenish, Palatinate. The former was bounded mainly by Bohemia and Bavaria, and its capital was

Palermo

Amberg. The Lower Palatinate, or Palatinate proper, lay on both sides of the Rhine and included the towns of Heidelberg and Mannheim. The counts Palatine were in possession of the Palatinate and the districts belonging to it as early as the eleventh century, and they were long among the most powerful princes of the German Empire. By the Peace of Westphalia in 1648 the Lower Palatinate was separated from the Upper, Bavaria receiving the latter, while the former became a separate electorate of the Empire and was henceforth generally known as The Palatinate. By the treaties of Paris, 1814 and 1815, the Palatinate was split up; Bavaria received the largest part, and the remainder was divided between Hesse-Darmstadt, Baden and Prussia. The name Palatinate now belongs to the detached portion of Bavaria on the west of the Rhine, while the Upper Palatinate forms another portion of Bavaria.

Palau, *pa low'*, **Islands**. See **PELEW ISLANDS**.

Pal'eontol'ogy, the science which treats of life that existed upon the earth before the age of man. Paleontology includes the study of fossils of both plants and animals. It is closely related to anatomy, botany and geology, and is one of the sciences upon which comparative anatomy is founded. The study of fossils according to the principles of paleontology is comparative, and it has enabled geologists to determine the relative advantages of the different rock formations and to divide geologic time into the periods and systems as they are now generally accepted. See **GEOLOGY**; **FOSSIL**.

Pa'leozo'ic Era, that division of geologic time extending from the Protozoic to the Mesozoic Era and including the Cambrian, Ordovician, Silurian, Devonian and Carboniferous periods, each of which is described under its title. The time covered by the Paleozoic Era was exceedingly long, as shown by the great thickness of the combined rock formations and the development of life from the protozoa to the vertebrates. See **GEOLOGY**; **MESOZOIC ERA**, and articles on the periods and systems named above.

Pal'er'mo, a seaport, the capital of Sicily, on the north side of the island, on the Bay of Palermo. The city is ornamented with numerous fountains and has many notable buildings, among which are a cathedral of the twelfth century, the churches of San Salvatore, San Domenico and San Giovanni degli Eremiti, a royal palace, the picture gallery, the armory, the

archiepiscopal palace, the customhouse and the theaters. The city is the seat of a university which has about 1400 students. It is the residence of the military commandant of the island and has an arsenal and shipbuilding yards. The manufactures consist chiefly of gloves, leather and glass, and the principal exports are sumach, wine and spirits, fruits, sulphur, oil, essences, cream of tartar and licorice. Among the articles of import are woolen, cotton and silk tissues, coffee, sugar, coal and porcelain. The fisheries are very productive and employ thousands of men.

Palermo was probably founded by the Phoenicians, and it afterwards became the capital of the Carthaginian possessions in Sicily. It was taken by the Romans in 254 B. C. The Saracens held it for a time, and in 1072 it fell to the Normans. The German emperors and the French subsequently held it, and from the time of the Sicilian Vespers it shared the fortunes of the Sicilian kingdom. Garibaldi captured the town in 1860. Population in 1911, 341,088.

Palestine or The Holy Land, a maritime country of Asiatic Turkey, in the southwest of Syria. Its length from north to south is about 150 mi.; its breadth, from 35 to 110 mi., and its area, nearly 10,000 sq. mi., or about the same as that of New Hampshire. The coast has no indentations, except the Bay of Acre in the north. The chief feature of the interior is the deep valley through which flows the Jordan, a river which intersects the country from north to south and connects three lakes—the Dead Sea, the Sea of Galilee and Lake Merom (See DEAD SEA). The surface of the country is generally mountainous, and the most remarkable peaks are Carmel, Jebel, Ebal, Gerizim, Zion, Moriah and the Mount of Olives. The maritime or coast plains of Sharon and Philistia, the river plain of Jordan and the plain of Esdraelon in the north, are the plains worthy of mention. The principal river is the Jordan. This river has a length of 200 miles, including windings, but its direct course is only about 70 miles. Its course from Merom to the Dead Sea is mostly below the sea level. The chief tributary of the Jordan is the Jabbok. The country is, on the whole, not well watered, as the river valleys, which are numerous, are dry for the greater part of the year.

The year in Palestine may be divided into two seasons, summer and winter. During the former, which lasts from April to November, little or no rain falls; during the latter there is

a considerable fall of rain, but the average annual rainfall is only about 20 inches. In the Jordan Valley and along the Mediterranean lowlands the summer heat is apt to be oppressive, on account of the extreme humidity of the atmosphere. During the winter the ground is seldom, if ever, frozen, except in the higher elevations.

The flora of Palestine is rich in flowering plants, including the scarlet anemone, the ranunculus, the narcissus, the crocus and the pheasant's eye. The country is now, as a whole, bare and desolate, though forests of pine and oak exist. The most common tree is the oak, including the prickly evergreen oak. Other trees are the olive, the palm, the oleander, the sycamore, the walnut, the ash and the cedar. The wild animals once included the leopard, the hyena, the bear, the wolf and the boar, but these have all disappeared. The domestic animals of burden are the ass, the mule and the camel. Cattle are not very numerous, but sheep and goats are abundant. Fish abound in the Sea of Galilee and in the Jordan. Agriculture is in a backward state, but cereals, grapes, figs, olives, oranges and apricots are produced. With irrigation and careful cultivation, large crops might be procured.

The ancient name of Palestine was Canaan, and when thus named, in the time of the patriarchs, the country was parceled out among a number of independent tribes, all probably Semitic. About the middle of the eleventh century B. C. these tribes were united under a king, Saul, and under his successors, David and Solomon, the kingdom remained united. In the tenth century a division occurred, the kingdoms of Israel, in the north, and Judah, in the south, taking the place of the early united kingdom. The kingdom of Israel was overthrown in 722 B. C. by Assyria; the kingdom of Judah in 586 B. C., by the Babylonians (See JEWS). In the time of Christ, Palestine was held by the Romans and was divided into the four provinces of Galilee, Samaria, Judea and Peraea. In the seventh century A. D. it was taken by the Saracens, under Omar. The severities exercised toward Christians gave rise to the Crusades, but Mohammedanism prevailed. The sultan of Egypt ruled the country till 1517, when it was incorporated with the Turkish Empire.

It is only within a comparatively recent period that the exploration of Palestine has been carried out systematically and with some attempt at thoroughness, though much yet remains to

Palestine

be done. The most valuable results have been those achieved under the direction of the Palestine Exploration Fund, a society organized in 1865 for the purpose of making an exhaustive exploration and an exact survey of the Holy Land. A large and detailed map of the country has been published and an immense mass of valuable information regarding topography, natural history, manners and customs has been accumulated. The present population of the country is estimated at 650,000.

Palestine, TEXAS, the county-seat of Anderson co., 100 mi. s. e. of Dallas, on the International & Great Northern railroad. The city is in an agricultural and fruit-growing country, near salt mines and deposits of iron ore. It contains railroad offices and shops, cotton factories and packing houses and has a considerable trade in cotton, grain, fruit and vegetables. There are two libraries, a Y. M. C. A. building, a fine city hall and an opera house. The place was settled in 1846 and was incorporated in 1870. Population in 1910, 10,482.

Palestrina, *pah les tree'na*, GIOVANNI PIERLUIGI DA (1524-1594), a celebrated Italian musician, one of the greatest musical geniuses in the world's history. He did much to start music upon the path of modern progress. His works consist chiefly of sacred music, the most important being *Stabat Mater*.

Palfrey, JOHN GORHAM (1796-1881), an American historian and clergyman. After his graduation from Harvard he studied theology, and in 1818 he became the minister of a Congregational-Unitarian church in Boston. From 1831 to 1839 he was professor of sacred literature at the Harvard Divinity School. He took an active interest in politics, was a member of the Massachusetts house of representatives, secretary of the commonwealth and a member of Congress. Among his writings are *The Evidences of Christianity*, *The Relation Between Judaism and Christianity*, and a *History of New England During the Stuart Dynasty*, this last his greatest work. From 1835 to 1843 he was editor of the *North American Review*.

Palgrave, *paolv'grave*, FRANCIS, Sir, (1788-1861), an English historian, whose best work is the *Rise and Progress of the English Commonwealth*. His other writings include a *History of England*, a *History of Normandy and England* and a number of works edited for the Record Commission. From 1838 until his death he was deputy keeper of the records.

Palissy

Pâli, *pah'le*, the sacred language of the Buddhists, as closely related to Sanskrit as Italian is to Latin. It is the language in which the oldest religious, philosophical and historical literature of Buddhism is written, and it is especially the language of the sacred books of the Buddhists of Ceylon, Burmah and Siam; but it is no longer spoken anywhere, though a corrupt form of it is to some extent used for literary purposes.

Palimpsest, a manuscript prepared by erasure for being written on again, especially a parchment so prepared by washing or scraping. This custom was brought about by the costliness of writing materials, and was practiced extensively in the monasteries, especially from the seventh century to the thirteenth. That which replaced the ancient manuscripts was nearly always some writing of an ecclesiastical character. The parchments which have been scraped are of course indecipherable, but those which have been washed have often been revived by chemical processes. Fragments of the *Iliad* and extensive portions of many Greek and Roman manuscripts have been recovered by these means.

Palisades, *pal y saydz'*, the name given to a cliff of nearly perpendicular rock, which extends along the western bank of the Hudson River from Haverstraw, N. Y., to Weehawken, N. J. The Palisades are about 30 miles in length and range in height from 200 to 500 feet. They rise abruptly from the water and add much to the scenery of this part of the Hudson. In places there are large accumulations of talus at the foot of the rock. The formation is of a volcanic rock, generally known as diabase. See HUDSON RIVER.

Palissy, *pa le'se*, BERNARD (1510-1590), a French artist and philosopher, best known as the inventor of a process for making beautifully colored pottery. After many years of study and hard work, passed in utmost privation, he was restored to fortune by the discovery of a method which enabled him to produce a most artistic ware. He obtained a pure white enamel, affording a perfect ground for the application of decorative art. On this ground he represented with consummate skill natural objects grouped and portrayed, and his enameled pottery and sculptures in clay became recognized as works of art. In 1562 he established himself at Paris, where he continued to work at his art and also delivered scientific lectures, which were attended by the most distinguished men in Paris. He suffered persecution as a Huguenot and was

Palladio

arrested in 1589 and thrown into the Bastille, where he is said to have died.

Palladio, *pal lah'de o*, ANDREA (1518-1580), one of the greatest classical architects of modern Italy, born at Vicenza. At Rome he made a thorough study of ancient monuments, and on his return to Vicenza he established his fame by his designs for many noble buildings, among which was his first great work, the magnificent two-storied arcade around the Basilica of Vicenza. He was the author of a *Treatise on Architecture*.

Palladium, a white metal with a bright luster, discovered by Wollaston in 1803 and found in small quantity associated with native gold and platinum. It presents a great general resemblance to platinum, but it is harder, lighter and more easily oxidized. On account of its hardness, lightness and resistance to tarnish, it is useful in the construction of philosophical instruments.

Palladium, originally, a statue of any protecting deity of a city. The term is particularly applied, however, to a statue of Minerva, said to have fallen from heaven, which was preserved in Troy. The belief of the Trojans was that as long as the palladium remained in the city they could not be conquered. Diomedes and Ulysses succeeded in carrying it off, and many legends are told as to its fate. The Romans professed to believe that it had been brought by Aeneas to Italy, but several Greek cities also claimed it.

Pal'las Athe'ne. See MINERVA.

Palma, *pahl'ma*, a city of Spain, capital of the island of Majorca, on the bay of Palma, 130 mi. s. by e. of Barcelona. It is built in amphitheater form and is walled and fortified. The principal buildings are the cathedral, the exchange, the governor's palace and the town-hall. There are schools of medicine and surgery, normal and art schools, two public libraries and a museum of painting. The city has manufactures of alcohol, liquors, chocolate, starch, soap, flour, leather, sugar and glass, and possesses also shipbuilding yards of some importance. The city is the port of the whole island and has a large trade. Population in 1910, 68,359.

Palma, TOMAS ESTRADA (about 1836-1908), a Cuban general and patriot, first president of Cuba. He became an ardent advocate of Cuban independence, joined the revolution of 1868 and was elected president of the new republic, but was captured and taken to Spain. After his release he founded a school in Orange County, New York, which he continued to manage until

Palmer

1895. In 1895 he was chosen as the foreign representative of the Cubans and went to live in New York. In December, 1901, he was elected president of the Cuban Republic by an almost unanimous vote. He was reelected in



TOMAS ESTRADA PALMA

1905, but the charge of fraud was immediately made, and an insurrection of considerable magnitude broke out. In September, 1906, affairs had come to such a crisis that the United States government intervened; Palma resigned and a provisional government was set up, under United States representatives.

Palmer, *pahm'ur*, MASS., a town in Hampden co., 15 mi. e. of Springfield, on the Chicopee River and on the Central Vermont and the Boston & Albany railroads. It contains manufactures of cotton and woolen goods, carpets, hats, wire and other articles. There are two libraries, a high school, a national bank and a savings bank. The place was settled in 1716 and was incorporated in 1775. Population in 1910, 8610.

Palmer, ALICE FREEMAN (1855-1902), an American educator, born at Colesville, N. Y., and educated at the University of Michigan. She taught a year in Wisconsin and was then for two years principal of the high school in East Saginaw, Mich., when she became professor of history at Wellesley College. Three years later she was appointed president and served in that capacity for five years, during

which time the standard of scholarship was raised, the number of students greatly increased and several new buildings were added. She resigned upon her marriage to G. H. Palmer, a professor at Harvard. Later she served for three years as non-resident dean of women at the University of Chicago. She was much interested in educational and reform associations, lectured often along educational and municipal lines and was for some time a member of the Massachusetts State Board of Education. She was honored with the degrees of Ph.D. from the University of Michigan, L.H.D. from Columbia and LL.D. from Union University.

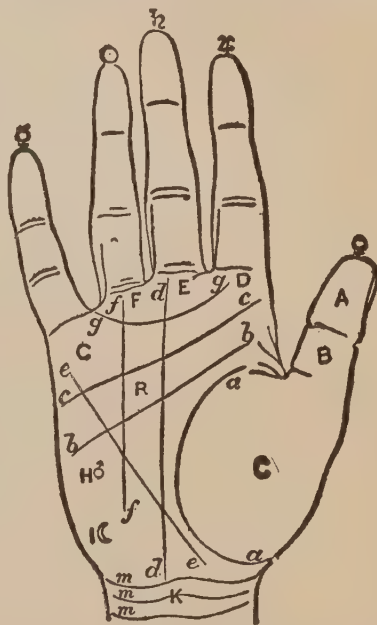
Palmer, JOHN MCAULEY (1817-1900), an American political leader and soldier, born in Scott County, Kentucky. He was admitted to the bar of Illinois in 1839 and served in the state senate as a Democrat, but in 1860 he was a member of the electoral college as a Republican. He took an active part in the Civil War and became major general of volunteers, having served at New Madrid, Island No. 10, Murrefreesboro, Chickamauga, Chattanooga and in the Atlanta campaign. He was governor of Illinois from 1869 to 1873 as a Republican, but in the latter year he returned to the Democratic party. He was elected United States senator from Illinois in 1891. In 1896 he became presidential candidate of the "Gold Democrats," or the National Democratic party.

Palmerston, palm'ur stun, HENRY JOHN TEMPLE, Viscount (1784-1865), an English statesman, educated at Harrow, at the University of Edinburgh and at Cambridge. He was returned to Parliament for Newtown in 1807, and in 1811 he was made a member for Cambridge University, which he represented for twenty years. From 1809 to 1828 he was secretary of war, and many reforms were introduced into the department during his term of office. A change in his attitude toward the reform question led to his withdrawal in 1828 from the Tory party, and two years later he became secretary for foreign affairs under the Whigs. His policy while in this office was marked by a friendly attitude toward France, with whose help England secured the independence of Belgium. Becoming secretary of foreign affairs in 1846, he held office until, in 1851, he was dismissed for having approved openly the policy of Napoleon III. Made prime minister in 1855, he prosecuted vigorously the Crimean War, and although his management of the war brought about his defeat in 1857 he was two years later

again made prime minister. One of the most marked characteristics of his later policy was his favorable attitude toward Italian union.

Palmetto, a common name of several species of palms, especially the cabbage palm, which grows in the West Indies and in the southern parts of the United States. It attains the height of 40 or 50 feet and is crowned with large leaves. It produces useful timber, and the leaves are made into hats, mats and other useful articles.

Pal'mistry or Chiromancy is the art of "reading the palm"—the art which professes to discover the temperament and character of any one, as well as the past and future events of his



PALMISTRY

A, will; B, logic; C, mount of Venus; D, mount of Jupiter; E, mount of Saturn; F, mount of Apollo; G, mount of Mercury; H, mount of Mars; I, mount of the Moon; K, the rascette; a, a, line of life; b, b, line of head; c, c, line of heart; d, d, line of Saturn, or fate; e, e, line of liver, or health; f, f, line of Apollo, or fortune; g, g, the girdle of Venus; R, the quadrangle; m, m, m, the bracelets of life.

life, from an examination of the *palm* of his hand and of the lines traced upon it. As an art, palmistry appears to be of great antiquity. It has an ancient literature of its own in India and was to some extent, at least, known to the ancient Greeks.

Of the cultivation of palmistry among the Romans there is little evidence; but in the second century Artemidorus of Ephesus, the author of a work on the interpretation of dreams, is said

to have devoted a whole treatise to the subject, which, however, is not extant.

The writers of the Middle Ages made frequent reference to the subject, and an important work was printed at Augsburg in 1475 by Johann Hartlieb. In the sixteenth century there were several treatises on the subject; in the end of the eighteenth century a celebrated palmist foretold the downfall of Napoleon; in recent times two Frenchmen, D'Arpentigny and Desbarrolles, have become the leading authorities, and it is on their works that modern English books on the subject are chiefly founded. The observation of the fingers and joints of the hand is quite as important to the chiromant as that of the palm itself. The thumb is generally regarded as the most important part of the hand. The first, or upper, phalanx of the thumb, when well developed, shows the presence of will and decision of character; the second, according to its development, indicates more or less logical power (See accompanying diagram for explanations through the remainder of the article). In studying palmistry the *mounts* of the hand, with the marks on them, and the lines in the palm are considered. The mounts are the elevations at the base of the fingers and thumb and in the side of the palm which extends from the root of the little finger to the wrist. The mounts are seven in number and are named from the planets, by the signs of which they are also known, namely, ♀ for Venus, ♃ for Jupiter, ♄ for Saturn, ☉ Apollo, ☿ Mercury, ♂ Mars, ☾ the Moon. When well developed, the mounts indicate the possession of the quality associated with the respective planets—for instance, Jupiter denotes pride and ambition; Saturn, fatality; Apollo, art or riches; Mercury, science or wit; Mars, courage or cruelty; Venus, love and melody; the Moon, folly or imagination. But the effect of a greatly developed mount may be modified by the lines in the palm or by other signs.

There are four principal lines—namely, the line of life, which surrounds the thumb, and which, if long, indicates a long life; the line of head, the line of heart, and the rascette, or the bracelets. The bracelets if well marked strengthen the effect of the line of life, each bracelet indicating thirty years of life. The line of heart, if long, clear cut and well colored denotes an affectionate and devoted character; and the nearer the line stretches to Jupiter the better the character. If the line end in a fork, so much the better. In actors and mimics this

line ascends the mount of Mercury. A good line of head—that is, a clear-cut, long, unbroken line—indicates the presence of superior intellectual qualities. If the line stretch to the mount of the Moon, it indicates imagination. A winding headline shows folly and indecision of character; a linked line (like a chain) denotes want of concentration. The other lines (which are not present in all hands) are the line of Saturn, or fate; the line of Apollo; the line of liver, or health, and the line of Venus. A long, clear-cut line of Saturn foretells a happy and prosperous life, while breaks or windings in the line foretell misfortunes or obstacles; a good line of Apollo shows that its owner will be successful in art; a good liver-line promises a long and healthy life; the Venus line, when present, indicates a character very liable to be influenced by the passion of love. Such marks on the mounts or lines as stars and crosses have their respective significations. A good open space between the lines of head and heart (the quadrangle) indicates a generous and noble disposition, while a very narrow space in the quadrangle is a sign of avarice and egotism.

Palm, palm, Oil, a fatty substance obtained from several species of palms, but chiefly from the fruit of the oil palm, a native of the west coast of Africa. This tree grows to the height of 30 feet, bears a tuft of large pinnate leaves and has a thick stem, covered with the stumps of the dead leaves. The fruits, which are borne in dense clusters, are about 1½ inches long by 1 inch in diameter, and the oil is obtained from their fleshy covering. In cold countries it acquires the consistence of butter and is of an orange-yellow color. It is employed in the manufacture of soap and candles and for lubricating machinery. By the natives of the Gold Coast this oil is used as butter, and when eaten fresh it is a wholesome and delicate article of diet.

Palms, a great group of trees, of which there are about 1200 different species, confined almost exclusively to the tropics, though a few species are to be found in temperate zones. Palms are among the most interesting plants in the vegetable kingdom, because of their beauty, variety and great value to mankind. Some are vines, as slender as a reed, and reach several hundred feet in length; others have stems three and even five feet thick. Some are of low growth; others tower nearly 200 feet above the ground. The leaves of palms are of two kinds—the pinnate, or fern-shaped, such as the date and the

cocoanut palm; and the palmate, or fan-shaped, examples of which are the common fan palm and the palmetto. The flowers grow in enormous clusters, usually hanging from the rosette of leaves which crowns the summit of the stem. The flowers are enclosed in heavy bracts, some of which are wood-like in texture and open with an explosion, to release the flowers. Humboldt estimated that on a single palm which he saw there were 600,000 flowers. Notwithstanding the small blossoms, some of the fruits are very large, as in the case of the cocoanut. Other species bear small berries, and still others have hard, bony nuts. Taken as a whole, it is thought probable that no family excepting the grasses is of so much benefit to mankind as the palms. Almost everything in the way of food, clothing, shelter or defense is furnished by one species or another to the simple inhabitants of the tropics, and the exportations to all parts of the world are enormous. See CABBAGE PALM; COCOANUT; DATE; DOUM PALM; IVORY PALM; PALMETTO; PALMYRA PALM; SAGO; TALIPOT PALM, and other titles.



Palm Sunday, the last Sunday in Lent, the Sunday which precedes Easter. It receives its name because it is observed in commemoration of Christ's entry into Jerusalem. In Roman Catholic churches palm branches, which have been blessed by the priests, are carried home and preserved, to be used in celebration of Ash Wednesday.

Palmy'ra, an ancient city of Syria, now in ruins, situated in an oasis in the Syrian desert, 120 mi. n. e. of Damascus. It was, according to tradition, founded or enlarged by Solomon and was identified with the Greek Tadmor. The Romans destroyed the city, but it was rebuilt, only to be again destroyed by the Saracens. A second time rebuilt, it was completely overthrown by Tamerlane. There are remains of ancient buildings, the most important of which is the Temple of Baal. Zenobia was the most famous ruler of Palmyra. See ZENOBIA.

Palmyra Palm, the common Indian palm, which is the chief support of millions of people.

Its fruit is a valuable food; its timber is excellent, and it furnishes thatch, cordage, materials for hats, fans, umbrellas and similar articles; sugar and arrack are made from it, and its leaves are used for writing tablets; the young shoots are boiled and eaten; the seeds are edible, and the fruit yields a useful oil.

Palo Alto, *pah'lo ahl'to*, BATTLE OF, the first important battle of the Mexican War, fought May 8, 1846, at the village of Palo Alto, 8 miles northeast of Brownsville, Tex. The American force of about 2300 was commanded by General Taylor, while the Mexican force numbered 6000 and was commanded by General Arista. The Americans were victorious after an all-day's contest, chiefly with the artillery. Arista retreated to Resaca de la Palma, where he was again defeated a few days later. See MEXICAN WAR.

Pamir, *pa meer'*, an elevated region of central Asia, which may be regarded as formed by the meeting of the Himalayan, Tian Shan and Hindu Kush mountains. It forms a plateau, with a general elevation of more than 13,000 feet, crowned by still loftier ridges and snow-topped summits. There are several small lakes, and the sources of the Oxus are found in the Pamir. The atmosphere is exceedingly dry, the extremes of heat and cold are very great, and a large part of the surface is barren. The inhabitants, however, find sufficient pasture for their cattle, and in favored localities there is a little cultivation. The "roof of the world," as the Pamir is called, is celebrated throughout central Asia, and trade routes have passed across it for ages.

Pam'lico Sound, a shallow lagoon on the southeastern coast of North Carolina. It is about 80 miles long, from 8 to 25 miles wide, and is separated from the ocean by long, narrow, sandy islands. It is connected with Albemarle Sound by the Croatan Sound.

Pan, a rural divinity of ancient Greece, the god of flocks and herds, originally represented as an old man with two horns, pointed ears, a goat's beard and a goat's tail. Later art made him a young man, differing from others only in his two short horns. The worship of Pan was well established, particularly in Arcadia. Pan invented the syrinx, or *pandean* pipes.

Pa'na, ILL., a city in Christian co., 40 mi. s.e. of Springfield, on the Illinois Central, the Baltimore & Ohio Southwestern and other railroads. Coal mining is the principal occupation, and there is a considerable trade with the surround-

ing agricultural region. The city has a public library and two banks, and it owns the waterworks. It was settled in 1853 and was incorporated in 1867. Population in 1910, 6055.

Panama, *pah na mah'*, the capital and chief city of the Republic of Panama, situated on the south coast of the isthmus, on Panama Bay. The city possesses a good harbor, well protected by small islands. Panama was founded in 1519, but its importance dates from the completion of the Panama Railroad in 1855, of which the city is the Pacific terminus. Up to 1904 the inhabitants were almost entirely supported by the inter-oceanic commerce over the railroad, but since the latter date canal operations by the United States government have contributed many additional advantages (see PANAMA CANAL).

Formerly the climate was considered very unhealthful for all except natives, and because of the lack of proper sanitary conditions the inhabitants suffered greatly from fevers and malaria. In 1904 the United States government took possession of the Panama Canal Zone, in which the city is located. By treaty between the United States and the Republic of Panama, the former installed systems of waterworks and drainage and was given full authority in matters of sanitation in the city, but with no other jurisdiction within its limits. The Sanitary Corps of the United States army has made Panama a healthful place of residence.

Panama has a large cathedral, several convents and a Jesuit college. Two miles inland are the largest hotel on the island and also the general hospitals for canal operatives. There is a fairly extensive commerce, the imports being four times the value of the exports; the former include cotton goods, coal, flour, silk and rice; the latter, gold, rubber and valuable woods. The population in 1912 was 37,500, of whom more than half were foreign born.

Panama, **ISTHMUS OF**, the strip of land which connects North and South America. Its general direction is east and west. It is also called the Isthmus of Darien. At its narrowest point it is only 31 miles wide. See PANAMA, REPUBLIC OF; PANAMA CANAL.

Panama, **REPUBLIC OF**, the most southerly country of North America, lying southeast of Costa Rica, and northwest of the United States of Colombia in South America. The Republic comprises nearly all of the Isthmus of Panama. Its length is nearly 400 mi.; its breadth varies from about 40 to 118 mi., and its estimated area is 33,775 sq. mi. The coast line on the

Caribbean Sea is 478 mi. in length; the Pacific shore line on the south is 767 mi. long.

DESCRIPTION. The surface of Panama is generally uneven and rocky. The Pacific coast is high and broken, but the Caribbean shore is low and more even. The country has a tropical climate and a heavy rainfall. The leading industries are grazing and agriculture and pearl fishing. The luxuriant forest growth which covers part of the country affords much valuable timber, little of which has yet been cut.

HISTORY. One of the first European settlements on the American continent was made at Darien, and this physical division at that time was called the Isthmus of Darien. In 1718 Panama was incorporated as a department of the Republic of New Granada. This union was dissolved in 1859 and Panama continued as an independent government for two years, when it assumed political relation with Colombia. In 1903 the United States proposed a treaty with Colombia whereby the former should have the privilege of the construction of the Panama Canal. In August of that year the Senate of Colombia rejected the treaty and the representatives from Panama withdrew, refusing longer to maintain political relations, for they felt that the future interests of Panama were imperiled. The Republic of Panama was proclaimed in November, 1903, and within two months a constitution was adopted. The United States immediately recognized the new republic and concluded with it a treaty for the construction of the canal.

GOVERNMENT. The president of the Republic must be 35 years of age; is chosen by popular vote for four years and is not eligible to reelection. He appoints his cabinet members, and also names five supreme court judges, the diplomatic representatives, and governors of the provinces. The National Assembly is a single chamber whose members, called deputies, are chosen by the people for four years. Exempt from government by the republic is the Canal Zone, a strip of land from ocean to ocean, 475 sq. mi. in extent, which is under the control of the United States. See PANAMA CANAL.

POPULATION. The principal cities are Panama, the capital, and Colon; each is described under its title. The population of the republic, including the Canal Zone, is about 380,000, and is made up of mixed races of Spanish, Indian and negro origin, and outside of the Canal Zone includes but few white men. The native tribes are fast disappearing.

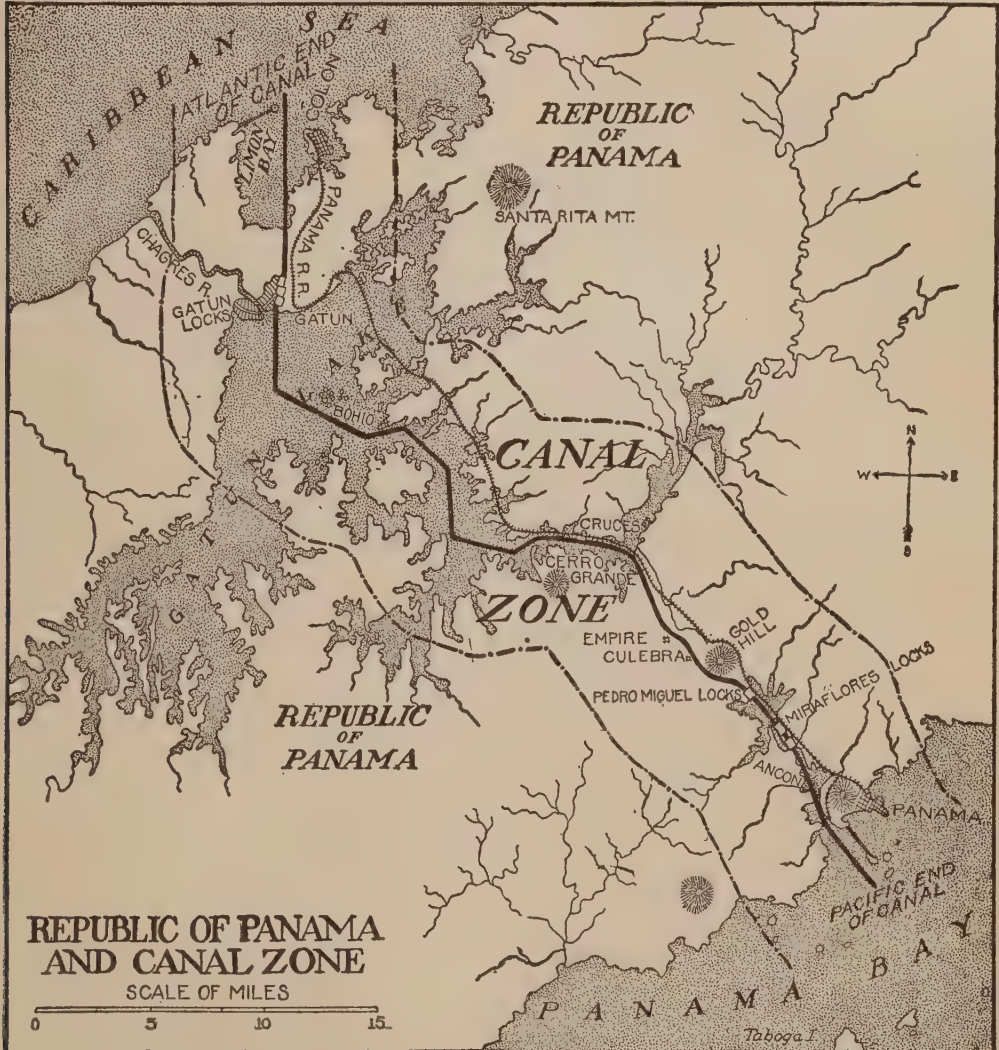
Panama Canal

Panama Canal, an artificial waterway across the Isthmus of Panama from Colon, on the Caribbean Sea to Panama, on the Pacific Ocean.

EARLY HISTORY OF THE ISTHMIAN PROJECT. The first desire for an isthmiian canal was aroused by the Spanish conquest of Peru and Chile. At that time Ferdinand, king of Spain, proposed

Panama Canal

when its representative to Nicaragua secured concessions for the construction of such a canal, and the following year Henry Clay, who was secretary of state, ordered an examination of the route, but the matter was dropped soon after. Three years later, the king of Holland obtained a franchise for the construction of the canal, but this plan was annulled the following year,



to cut a canal through the Isthmus of Panama, and his successor, Philip, thought favorably of a route across Nicaragua, but on account of European complications nothing was done for years with either project.

The United States government first became interested in the isthmiian canal project in 1825,

and nothing further of importance was done until 1847, when Great Britain obtained control of the proposed route. Great Britain's claim was disputed by the governments of Nicaragua and the United States, and no steps were taken to push the work. In 1849 Cornelius Vanderbilt formed a company which secured concessions

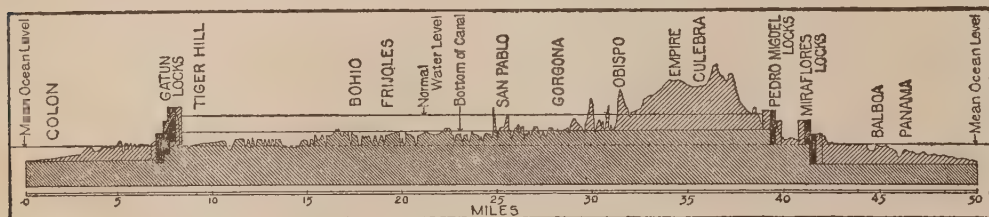
from Nicaragua for the construction of a canal. In the meantime the discovery of gold in California increased the demand for such a waterway, and the Vanderbilt company began operations.

After spending about two millions of dollars, however, they found that the project was beyond their ability and attempted to secure the aid of the United States government. This aid was refused and the project fell through.

BEGINNINGS OF THE CANAL. The history of the Panama Canal proper dates from 1878, though some years previous to this, George M. Totten, chief engineer of the Panama Railroad, made a tentative survey for a canal, following the line of the railroad, and showed the feasibility of its construction, estimating the cost at from \$60,000,000 to \$150,000,000. His report was followed by a government survey, under the direction of Commander E. P. Lull of the United States navy. This survey resulted in locating the canal practically on the present route. In 1878 a concession was given Lieutenant Weyse

The receiver was authorized to organize a new company, but on account of legal difficulties, he was unable to complete the reorganization until 1894. The new company, known as the Panama Canal Company, was capitalized at \$13,000,000, and stock to the amount of \$1,000,000 was given to the United States of Colombia. The company abandoned the sea level project and substituted a series of locks in place of it, since this would greatly reduce the expense of construction. During the next few years a little work was done and about \$8,000,000 had been expended when the company again ceased operations.

In the meantime, several events had occurred to keep alive the interest in the Nicaragua route, and in 1895 the Congress of the United States authorized the appointment of a commission to investigate thoroughly its advantages. This commission, generally known as the Ludlow Commission, made a tentative survey of the Nicaragua route and reported to Congress. In 1899 President McKinley was authorized to



PANAMA CANAL IN PROFILE
Upper shading showing the excavated portion

and others by the government of Colombia to construct and maintain a canal across the isthmus. In the year following, a congress of 135 engineers was called at Paris, under the direction of Ferdinand De Lesseps, the builder of the Suez Canal. After a thorough discussion of the various routes proposed, the congress voted unanimously in favor of the Panama route. Immediately after the adjournment of the congress the Interoceanic Ship Canal Company was organized, and De Lesseps was made president. This company proposed to cut a sea level canal $29\frac{1}{2}$ feet deep, from 72 to 78 feet wide at the bottom and from 92 to 164 feet wide at the surface. At the close of 1888 this company had expended \$200,000,000 and had not completed one-third of the work. Being pressed for funds, the company resorted to bribery as a means of securing additional aid, and their operations grew into the most noted financial scandal in French history. The company was finally declared bankrupt, and a receiver was appointed.

appoint a larger commission, with powers to make a more thorough and complete investigation. This is generally known as the Walker Commission, from its Chairman, Rear Admiral John G. Walker of the United States Navy. After a very thorough investigation, the commission reported in favor of the construction of a canal by the Nicaragua route, stating that the principal reason for this report was the financial difficulty involved in purchasing the right of way from the Panama Canal Company, who wanted \$102,400,000 for their franchises and property, while the estimate of the commission on the value of these assets was \$40,000,000.

Immediately after this report was rendered to Congress, the French company offered to sell to the United States their entire claims, including franchises, machinery, right of way and the Panama railway, for \$40,000,000, the value placed upon them by the commission. Following this offer the commission made a supplemental report recommending the pur-



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PANAMA CANAL

First ocean-going vessel passing through Gatun Locks, June 8, 1914. Type of electric locomotive to be used in towing.



PANAMA CANAL

Former Culebra Cut, at Empire, looking north from hill on west bank. This has been renamed Gaillard Cut, in memory of the engineer who sacrificed his life to duty.

chase of the property and the adoption of the Panama route. In the meanwhile the House of Representatives had passed a bill authorizing the construction of the canal by the Nicaragua route, but this bill was rejected by the Senate in view of the supplementary report of the commission, and in place of it the Senate passed the Spooner Act, which authorized the president to purchase of the Panama Canal Company all their assets pertaining to the canal, for the sum of \$40,000,000, providing a valid title to the property could be secured and a satisfactory treaty for the construction and control of the canal could be ratified with the United States of Colombia. This measure was accepted by the House and became a law in June, 1902.

In pursuance of the provisions of this act, a treaty was negotiated between Honorable John Hay, secretary of state of the United States, and Dr. Herran, minister plenipotentiary from Colombia, and presented to the Senate of the Fifty-seventh Congress, in January, 1903. The treaty provided for the construction and control of the canal by the United States and the payment to the United States of Colombia of \$10,000,000 in gold for the concessions granted, and an annuity of \$250,000 a year after nine years following the ratification of the treaty. At an extra session of the Senate this treaty was ratified on March 18, 1903, and sent to the Colombian government. After several months of delay, during which the treaty was the subject of several stormy debates in the Colombian Senate, it was rejected by that body before its final adjournment in August. This rejection led to the immediate withdrawal of the senators from the State of Panama, and ultimately to the secession of that state and the formation of a new republic. This was soon recognized by the United States government.

CANAL ZONE. Immediately after its organization the Republic of Panama sent to the United States Senate a treaty providing for the construction of the canal on nearly the same terms as were imposed in the proposal rejected by the United States of Colombia. The Panama treaty was ratified by the United States Senate February 24, 1904. It contained a provision that for purposes of administration of canal affairs a strip of land from ocean to ocean, through the center of which the canal was projected, should be ceded to the United States for the sum of \$10,000,000. In addition, for the canal concession, there was to be an annual rental of \$250,000 paid to the Republic of

Panama. This strip, designated by the American government as the Canal Zone, contains 475 sq. mi.

Early in March, 1904, President Roosevelt appointed a canal commission. On May 4th the commission took formal possession of the canal property and the payment of the \$40,000,000 was promptly made to the French company.

PROGRESS OF THE WORK. The first chief engineer, John F. Wallace, and his successor, John F. Stevens, both distinguished engineers, were able to do little construction work on the canal because it was not until June, 1906, that Congress finally adopted the report of the engineers in favor of a lock canal. Bids were invited from contractors, but when these were opened in January, 1907, none seemed satisfactory. President Roosevelt, therefore, placed the work under the control of the corps of engineers of the United States army, and Major George W. Goethals became chief engineer and chairman of the Isthmian Canal Commission on April 1, 1907. During 1907 and 1908 excavation was rapidly pushed, and work on the Gatun and Miraflores dams was begun. In 1909 the power house and concrete plant at Gatun were put into operation and the first concrete was laid. In the next four years the work progressed so rapidly that the canal was finished and ready for operation more than a year before the date set for its completion. On September 26, 1913, a tugboat was successfully passed through the Gatun locks, and on October 10 the Gamboa dike was blown up, allowing the waters of Gatun Lake to flood the Culebra cut. The first steam vessel to pass through the canal from ocean to ocean was the crane-boat *A la Valley*, on January 7, 1914.

THE COMPLETED CANAL. The summit elevation of the canal is about 85 feet above sea level. From the Atlantic end of the canal, in Limon Bay, to Gatun, is a sea level channel 6.9 miles long and averaging 500 feet wide. At Gatun the great locks, in three lifts, raise the level to 85 feet. These locks have two chambers side by side, each 110 feet wide, and will accommodate ships 1000 feet long. From Gatun to Pedro Miguel, a distance of 31.5 miles, the channel of the canal passes through Gatun Lake and Culebra cut. The lake, which has an area of 165 square miles, is formed by the overflow of the Chagres and other rivers. This overflow is held by two earth dams at Gatun and at Pedro Miguel. The Gatun dam is 800 feet long, including the concrete spillway, and has a width

of 100 feet at its crest and 400 feet at the normal level of the water. At Pedro Miguel is another lock, through which vessels are lowered to the level of Miraflores Lake, 55 feet above the level of the Pacific. The two Miraflores locks lower vessels to tide level. The length of the canal from shore to shore is about $41\frac{1}{2}$ miles, but the channel extends seaward for $4\frac{1}{2}$ miles on the Atlantic side and 4 miles on the Pacific, making the total length of the canal and its approaches approximately 50 miles.

Nine and one-half to twelve hours is the time required for the passage of a ship from one end of the canal to the other. No vessel may enter or pass through the locks under its own power, but is towed by electric locomotives running on cog rails laid along the top of the lock walls. The number of locomotives required varies with the size of the ship; ordinarily four will be used, two ahead, one on each wall, to pull, and two astern, to steady the motion of the ship.

SANITATION. The completion of the Panama Canal would have been impossible without the splendid work of Colonel (now General) Gorgas and his aides of the sanitary department. The extermination of the mosquito, the installation of drainage and sewage systems, the war on yellow fever and other tropical diseases—these made it possible for white men to live and work efficiently. Panama City and Colon, for purposes of sanitation only, are also under the jurisdiction of the United States.

CANAL TOLLS. By act of Congress in 1912, American owned ships were exempted from payment of tolls. This exemption was immediately attacked as a ship subsidy, and was also opposed by Great Britain as a violation of the Hay-Pauncefote treaty of 1901. On March 5, 1914, President Wilson requested the repeal of the exemption clause, for the reasons given above and also for its effect on the foreign policy of the United States. The clause was promptly repealed by the House on March 30, and after much debate by the Senate on June 11, with the amendment that the repeal did not mean a waiver of any rights. The amended bill was accepted by the House, and was signed by the President on June 15.

Panama-Pacific International Exposition, an exposition at San Francisco, California, arranged to celebrate the formal opening of the Panama Canal. The exposition is scheduled to open Feb. 20, 1915, and to close on Dec. 4. The site of the exposition fronts on San Francisco Bay for nearly two and a half miles, and covers an area

of 625 acres. Architecturally the dominating feature of the exposition is the great Tower of Jewels, 435 feet high. This tower will be illuminated at night and will cast beautiful reflections in the Court of Honor. Surrounding the tower and the Court of Honor are the principal palaces; those of liberal arts, education, agriculture, fine arts, transportation, manufactures, mines, machinery and varied industries. To the west of the central group is the section devoted to the buildings of the states and the foreign nations. Thirty-six nations have officially accepted the invitation to be represented, and private exhibits will be sent from most of the remaining countries of the world. At the extreme eastern end of the grounds are the amusement features, concessions and restaurants; about \$10,000,000 is being spent on the preparation of this section.

Pan-American Congress, a congress of delegates from the Republic of Mexico and the Central and South American states, assembled at Washington, Oct. 2, 1889, for the purpose of discussing the formation of an American Customs Union, under which the trade of American nations with one another might be maintained. The congress continued without final adjournment for five months and voted to recommend the establishment of regular communications between the ports of the several American states, common trade and customs regulations, weights and measures, patent, copyright and trade-mark laws, a common legal tender silver coin and a plan for arbitration of all disputes.

THE CONGRESS OF 1901-1902. The second Pan-American Congress, embracing all the American republics, convened in the city of Mexico, Oct. 22, 1901. The main purposes of this congress were the same as those of the former. Plans for the construction of a railway to connect North and South America, for the establishment of a standard coin which shall be legal tender in all the countries represented, for a uniform system of quarantine and, in general, for bringing the American republics closer together, were recommended. A plan for arbitration based on that of the Peace Conference at The Hague, was adopted. See BUREAU OF AMERICAN REPUBLICS.

THE CONGRESS OF 1906. The third congress was held at Rio de Janeiro, Brazil, in July and August, 1906, and was attended by representatives of all important nations of North America, South America and Central America. The principal topics under discussion were commercial relations, the codification of laws,



PANAMA-PACIFIC INTERNATIONAL EXPOSITION
A view looking towards San Francisco harbor. The Palace of Varied Industries is on the left, the Palace of Machinery on the right.

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PANAMA-PACIFIC INTERNATIONAL EXPOSITION
The Palace of Education. On the left is seen the dome of the Palace of Philosophy.

the regulation of patents, the improvement of methods of sanitation, the construction of the Pan-American railway, the consideration of means of arbitration of disputes between nations and, most important of all, the discussion of the Drago or Calvo Doctrine. This, in effect, declares that debts owing by South American nations to nations of Europe cannot be collected by forcible intervention. This subject was referred to the Hague Peace Conference.

THE CONGRESS OF 1910. The fourth was held in Buenos Ayres, beginning in July. Matters relative to a Pan-American Union were discussed, and a resolution was offered recommending that all American states bind themselves to submit to arbitration all claims for damage that may be presented by their respective citizens and which cannot be settled through ordinary diplomacy.

Pan-American Exposition, an exposition held at Buffalo, N. Y., from May to November, 1901, to show the progress made by the American republics during the nineteenth century. The expense of the exposition, amounting to \$10,000,000, was assumed by the citizens of Buffalo. The exposition was formally opened May 20 and was closed November 2. Eighteen countries, including Cuba and Haiti, made exhibits. Venezuela, Paraguay and Uruguay were not represented; the United States government spent \$500,000 in special exhibits, and most of the states were represented by buildings and exhibits.

Architecturally the Pan-American Exposition will have an abiding place in American history. The buildings were of styles common in the South American countries, the harmonious blending of the colors producing a veritable "Rainbow City." The electric tower, which was the focus of the architectural scheme, stood 409 feet high, while from its base gushed a torrent of water, brought directly from Niagara River.

Pan'creas, **THE**, a long flat gland, in structure like the salivary glands, that lies just behind the stomach. It is about eight inches long, two and a half inches wide and one inch thick, and it communicates with the intestine by a duct which runs the length of the pancreas and pours its contents into the duodenum. The pancreatic juice acts on starch, on fat and on proteids, changing the last into peptones, which resemble those formed by the gastric juice. It separates the fats into minute particles and into their chemical parts, namely, glycerine and an acid peculiar to each fat. The alkaline quality

of the juice then makes soap of the fatty acids. See **DIGESTION**; **PEPTONES**; **PROTEIDS**.

Pancreatin, *pan'cre at'in*, used as an aid to digestion, is extracted from the pancreas of a hog, killed about six hours after a full meal. The elements of pancreatin are *trypsin*, which digests proteids; *amyllopsin*, which has the power of converting starch into sugar; *steapsin*, which emulsifies fats, and a property that will curdle milk. See **DIGESTION**.

Pando'ra, in Greek mythology, the first woman on earth. Jupiter, angered at Prometheus for stealing fire from heaven for mankind, determined to punish man as well as Prometheus. To accomplish the former purpose he created a woman. All of the gods bestowed gifts on her, and by reason of this she was called Pandora, which means *all gifts*. Mercury was instructed to take Pandora to Prometheus, who refused, however, to receive her. She was then taken to Epimetheus, the brother of Prometheus, who gladly took her into his house. A short time afterward, Mercury appeared with a box, which he left in the care of Pandora, giving her strict instructions not to open it. Her curiosity was too strong, however, and she removed the cover from the box, thus releasing all of the ills which have since troubled mankind. After the last of these was out, she heard a sound within the box, and on raising the cover she discovered Hope within. According to other accounts, the box contained blessings, which, with the exception of Hope, flew away when the box was opened and were lost.

Pansy. See **VIOLET**.

Pan'theism, in philosophy, the doctrine which considers God and the material universe to be identical. Pantheism has been the foundation of nearly all the chief forms of religion which have existed in the world. It was represented in the East by the Sankhya of Kapila, a celebrated system of Indian philosophy. The Persian, Greek and Egyptian religious systems were also pantheistic. Spinoza is the most representative pantheist of modern times. A twofold division of pantheism has been proposed—(1) that which loses the world in God, one being in whose modifications are the individual phenomena; (2) that which loses God in the world and totally denies the substantiality of God. Pantheism is generally considered atheistic by the followers of Christianity.

Pan'theon, a celebrated temple at Rome, the best preserved of the ancient buildings; built in 123 A. D. by the emperor Hadrian. It is a

Panther

large edifice of brick, built in circular form, 142 feet in diameter. It has the finest dome in the world, measuring 142½ feet in internal diameter and 143 feet in internal height, and its portico, almost equally celebrated, is supported by sixteen Corinthian columns of Egyptian marble. It is now a church and is known as Santa Maria Rotonda. Raphael and other famous men are buried within its walls.

The Pantheon in Paris, for some time the Church of Saint G  n  vi  re, is a noble edifice with a lofty dome, devoted to the interment of illustrious men of France.

Panther, one of the cat family, now supposed to be identical with, or a mere variety of, the leopard in the old world and the puma in this country. See LEOPARD; PUMA.

Pan'tomime, the expression of thoughts and emotions through gestures and actions and without words. This art was developed by the ancient Romans. In the earliest pantomimes, only one actor was upon the stage at a time, but later, several acted together. They at first wore masks. The art of pantomime flourished throughout the days of the Empire, and it later spread to Italy and France, where in the seventeenth and eighteenth centuries it had great vogue. The first pantomime in England was probably early in the eighteenth century. It was there that the well-known Christmas pantomime was originated, with the old characters of Harlequin, Columbine and others. At other times than Christmas, pantomimes were given, however, the basis of the acts being found usually in the old fairy tales or in the *Arabian Nights*. Only occasional attempts have been made to produce pantomimes in the United States, the most noteworthy one being the *Humpty Dumpty*, which gained popularity about 1870.

Pa'pacy. See POPE.

Pa'pal States or States of the Church, the name given to that part of central Italy which, until the latter half of the nineteenth century, was subject to the temporal authority of the pope. The territory extended irregularly from the Adriatic to the Mediterranean and latterly comprised an area of about 15,000 square miles. Rome was the capital. The Papal States were, with the exception of the capital and the land immediately adjoining, made a part of the territory of Victor Immanuel in 1860, and Rome was annexed to the kingdom of Italy ten years later. At this date the temporal authority of the pope ceased, except over his palace, the vatican.

Paper

Papaw' or Pawpaw', a small tree that grows in the United States and bears a fruit from two to six inches in length and an inch or so in diameter. This fruit has a thin rind, numerous large, kidney-shaped seeds and a sweetish, soft pulp. It is not generally cultivated, except as an ornamental tree.

Paper, a thin, flexible substance, made from vegetable fiber and used in writing and printing and for many other purposes. Paper takes its name from *papyrus*, a plant used by the Egyptians for a fabric upon which to write; but papyrus was not paper, and the art of paper-making did not originate with its use (See PAPHYRUS). It is not known who discovered this art, but paper was made by the Chinese two centuries before the beginning of the Christian era, and they were probably the inventors. Paper was in use in Europe during the eleventh century, and by the thirteenth century it was well known. By the beginning of the fourteenth century it had become common in England, but it was not manufactured there until 1685. The first paper mill in the United States was built near Philadelphia in 1690, but it was more than one hundred years before paper was manufactured in large quantities in this country.

MANUFACTURE. Paper can be made from any vegetable fiber, also from silk and wool, though these substances are not desirable. Formerly all paper was made from cotton and linen rags, and the work was performed entirely by hand labor. The rags were cleaned, freed from all buttons, threads, knots or other portions that would hinder their being worked into pulp. They were then soaked and ground into a fine pulp, which was floated in water. The consistency of the pulp determined the thickness of the sheet of paper. The tank in which it was confined was continually stirred to secure an even distribution, and the paper was made by dipping shallow boxes, called *deckles*, with bot-



toms of wire screening with fine meshes, into the tank containing the pulp. The water was allowed to drain out as the box was raised. This left a thin coating of the pulp evenly distributed over the wire screen. The box was then inverted over a layer of felt, upon which the forming paper fell. These layers were laid in piles, and more water was pressed from the paper. After this the sheets of felt were spread out until the paper became dry enough to hold together. The drying process was then completed by hanging it upon lines, either in a yard around the mill or in a drying room. The size of the sheet was determined by the size of the box. The paper manufactured in this way had a very rough surface and was of poor quality.

Paper is now made entirely by machinery, but the processes common to the old hand mill are still in use. The rags are thoroughly washed, then shredded by machinery and passed through three sets of grinders, called *engines*, to reduce them to a pulp. These grinders consist of knives, fastened to revolving cylinders and playing between smaller knives in the bottom of an oval tank. The rotation of the cylinder gives the water in the tank a motion which draws the pulp under the grinder. During the process the necessary bleaching matter, sizing and coloring matter are added. When the grinding is completed, the pulp resembles a quantity of rice and milk. From the last grinder it is sent to the storage tank, from which it is pumped to the paper-making machine. All machine-made paper is now manufactured on what is called the *Fourdrinier* paper-making machine. It is from 125 to 150 feet long, and its width depends upon the size of the paper it is designed to make. The machine is divided into three sections—that which receives the pulp and forms it into the sheet or web; that which dries the paper, and the finishing rolls, which are usually known as the *calender* rolls. The drying section contains a number of hollow steel cylinders, from one to three feet in diameter; they are heated by steam, which enters through the trunnions on which they turn. The calender consists of a number of solid steel rolls, which press and polish the paper as it passes between them.

The paper-making section of the machine is the most intricate and also the most interesting. It consists of a long, narrow trough, into which the pulp is pumped; an endless belt of wire cloth, about thirty feet long, mounted upon numerous small rollers and having beneath it a number of vacuum boxes which are connected with air

pumps; an endless belt of felt, which extends from the belt of wire cloth over the first sets of drying rolls, and the *dandy* roll, which is a small roll covered with wire cloth and placed above the paper at the point where the belt of wire cloth meets that of felt.

The pulp is pumped from the storage tank into the trough, from which it flows in a wide, thin stream upon the belt of wire cloth. This has a vibrating motion from side to side, which weaves the fiber together and strengthens the texture of the paper as the pulp passes over it. Most of the water falls through the meshes of this cloth as the pulp passes along, and the vacuum boxes assist in drawing out much of the remainder. The even edges of the paper are secured by rubber bands, called *deckle bands*, on each side of the belt. The dandy roll presses down upon the upper surface of the paper and determines the style or quality. When the roll is covered with wire cloth of the same structure as that of the belt, a *wove* paper is made. When the roller contains wire bands which make straight parallel lines in the sheet, a *laid* paper is made. The *water mark*, which is seen by holding a sheet of paper to the light, is produced by placing the design upon the dandy roll and is impressed upon the web at each revolution of the roller. This is a guarantee of the quality and is found on all good grades of paper.

When the paper leaves the wire belt, it is practically completed, and all of the other operations consist in drying and finishing it. The belt of felt takes the web from the wire belt and carries it to the first set of drying rolls, from which it passes on to succeeding sets, until all of the water has been expelled. The felt accompanies the web through three or four sets of rollers, until it has become sufficiently strong to withstand the strain of the machine. From the drying rollers the paper passes to the calender machine, if there is one, and as it passes from the calender, it is either wound into rolls or cut into sheets, according to the use for which it is intended.

The enormous demand for paper has for many years made it necessary to employ other material than rags, and now wood is very generally used in the manufacture of paper for newspapers and for the cheaper grades of books. With the exception of transforming the wood into pulp, the process of manufacture is the same as that already described. Wood pulp is made by cutting the logs into short lengths, which are split into pieces and ground down on rapidly revolving grind-

stones, operated by steam or water power. Wood fiber is made by digesting short pieces of wood in boilers containing a dilute solution of sulphuric acid, heated to a high temperature. The pulp and fiber are mixed in proper proportions to give the paper sufficient strength, and after bleaching they pass through the paper machine in the same manner as paper made from rags.

Some of the coarsest grades of paper are made of wheat straw, and other grades are made of Esparto fiber and corn husks. Most of the tissue paper is made from hemp, old ropes being the material generally used.

VARIETIES. There are many grades and varieties of paper. The best quality is known as *linen* paper; it is generally used for writing paper and for printing bonds and other documents that are to be preserved for a long time. However, scarcely any of the so-called linen paper is made wholly of linen rags; in fact, much of it contains only a small proportion of linen. The ordinary writing paper and most of that used in printing magazines and books is made of a mixture of rags and wood pulp. However, if a large proportion of wood is used, the paper soon turns yellow on exposure to the light. *Manila* paper takes its name from Manila hemp, though much of the paper so named does not contain any of that material. *Japanese* and *Indian* papers are noted for their peculiar texture, which is due to the method employed in their manufacture. These are usually handmade.

The United States manufactures more paper than any other country, and the annual output exceeds one and one-third million tons. See **BOOK; NEWSPAPER; PRINTING.**

Paphos, *pa'fos*, the name of two ancient cities in Cyprus, Old Paphos, upon a height, a little more than a mile distant from the southwestern coast, and New Paphos (modern Baffo), on the seashore, seven or eight miles to the northwest of Old Paphos. The first was famous in antiquity for the worship of Venus. During Roman rule New Paphos was the official seat of the government of Cyprus.

Papier-Mache, *pah pay' mah shay'*, paper pulp pressed into shape, much used in the manufacture of boxes, trays and light articles. It is covered with a coat of hard varnish that takes a fine polish. Sometimes it is beautifully inlaid or decorated by painting or in other ways. The natives of India, China and Japan were the first to manufacture it, but the Europeans now make it in large quantities. A substitute for the true papier-mache is now made by gluing together

thick sheets of coarse paper and putting them under very heavy pressure. Thick pasteboard is also used as a substitute and is known by the same name.

Paprika, a condiment prepared from the dried ripened fruits of various species of pepper, particularly from one member of the capsicum family. (See **CAPSICUM**.) As the seeds are removed, paprika is much less pungent than ordinary red pepper.

Pap'ua. See **NEW GUINEA.**

Papyrus, a water plant which furnished the material upon which the ancient Egyptians did their writing. The root is very large, hard and creeping, and the triangular stem is several inches in diameter and from twelve to fifteen feet high. Formerly it was extensively cultivated in Lower Egypt, but it is now rarely seen there. It is abundant in the warmer regions of Africa in many places and is found in southern Italy. The inhabitants of some countries where it grows manufacture it into various articles, including sail cloth, cordage, wearing apparel and boats. Among the ancient Egyptians its uses were equally numerous. The paper obtained from it consisted of thin strips, carefully separated from the stem longitudinally, laid side by side and then covered transversely by shorter strips, the whole being fastened together by the use of water and some gummy substance. These mats were fastened together to make one long roll, in case the writing was extensive. The writing materials were a reed pen and an ink made of animal charcoal and oil. Thousands of these papyri or papyrus rolls still exist. Many of them were found in the ruins of Heracleum, but their contents, so far as deciphered, have been of only moderate value. Papyrus was used in Europe till the Middle Ages and was an important export from Egypt. See **BOOK; PAPER.**



PAPYRUS PLANT

Para

Para, *pah rah'*, or **Belem**, a city and seaport in Brazil, capital of the Province of Para, on the right bank of the estuary of the Para River. The principal buildings are the governor's palace, the cathedral and the bishop's palace. There is in the city a lyceum, a seminary, a public library, a botanical garden and a museum. The port, defended by forts, admits vessels of large size. The principal exports of the city are cacao, rubber, Brazil nuts, isinglass, rice and drugs. Other exports are numerous. Population in 1910, estimated at 100,000.

Parable, a short story of events which might occur in real life, told not for entertainment, but for the pointing of a moral. The Bible contains numerous parables, which, by reason of their directness and their close relation to the lives of the hearers, surpass all others that have ever been written. Among the most familiar of the Biblical parables are, in the Old Testament, the story of the ewe lamb, told by Nathan to David; in the New Testament, the parables of the sower, the tares, the mustard seed, the good Samaritan, the prodigal son, the rich man and Lazarus, the ten virgins and the talents.

Parab'ola. See CONIC SECTIONS.

Parachute, *par a shoot'*, an apparatus of an umbrella shape and construction, usually about twenty or thirty feet in diameter, attached to balloons, by means of which the aeronaut may descend slowly from a great height. It is shut when carried up and expands of itself when the aeronaut begins to descend; but it is not altogether to be depended on. See BALLOON.

Paraffin, a solid white substance, of a waxy appearance, which is separated from petroleum and ozokerite and is very largely obtained by the destructive distillation of various organic bodies, such as brown coal, or lignite, bituminous coal and shale. The process generally consists in heating bituminous shale in iron retorts at a low red heat; condensing the tarry products and purifying these by distillation, by washing successively with soda, water and acid, and again by distillation. Those portions of the oil which solidify in the final distillations are collected separately from the liquid portions, washed with soda and acid and crystallized or again distilled. The partially purified paraffin is again treated with acid, is allowed to solidify, is submitted to the action of centrifugal machines and finally is strongly pressed, in order to remove any liquid oil which may still adhere to it. The refined paraffin is largely manufactured into candles, which may be either white or colored.

Paraguay

Paraffin is also used for vestas and tapers, for water-proofing, sizing and glazing fabrics, as an electric insulator and as a coating for the inside of beer barrels. The liquid oils obtained in the process come into commerce under the general name of paraffin oil, the lighter oils being used for lubricating purposes. See PETROLEUM.

Paragould, ARK., the county-seat of Greene co., is on the Paragould Southeastern, the Saint Louis, Iron Mountain & Southern and other railroads, 21 mi. n. e. of Jonesboro. It is a shipping point for lumber, and its industries include cotton-gins, roller mills and the manufacture of stave barrel heads, ice, foundry products and other articles. Population in 1910, 5248.

Paragua, *pah rah'gwa*. See PHILIPPINE ISLANDS.

Paraguay, *par'a gway* or *pah'ra gwi*, a republic of South America, between the parallels 22° 4' and 27° 35' south latitude and between the meridians 54° 32' and 58° 40' west longitude. It is bounded on the n. by Bolivia and Brazil; on the e. by Brazil and Argentina, and on the s. and w. by Argentina. The Paraná River forms a part of the eastern and southern boundary, and the Pilcomayo and Paraguay rivers form the western boundary. The length from north to south is about 375 mi., and the greatest length from east to west is a little over 400 mi. The area is 157,000 sq. mi., or a little less than that of California.

The whole surface belongs to the basins of the Paraguay and Paraná rivers, numerous tributaries of which intersect the country. Along the Paraguay and in the south, adjoining the Paraná, are extensive swampy tracts; westward of the Paraguay the country is little known. Elsewhere the surface is well diversified with hills and valleys and rich alluvial plains. The climate is agreeable, the mean annual temperature being about 75°. The natural fertility of the soil is shown by a vegetation of almost unequaled luxuriance and grandeur. In the forests are found at least sixty varieties of timber trees, besides dye-woods, gums, drugs, perfumes, vegetable oils and fruits. Many of the hills are covered with the *yerba mate*, or Paraguay tea. The larger plains are roamed over by immense herds of cattle, which yield large quantities of hides and tallow; and on all the cultivated alluvial tracts sugar cane, cotton, tobacco, rice and maize are raised in profusion. The chief exports are Paraguay tea, sugar, tobacco, fruits, cotton, rubber, hides, tallow, cattle, horses, mules, wool, leather and an extract extensively used in tan-

Paraguay

ning, known to commerce as *quebracho*. The imports consist almost wholly of manufactured goods, foodstuffs and machinery.

The government is a republic. The executive power is vested in a president, who is elected for four years and is assisted by five ministers. The legislative department consists of a Congress comprising a Senate and a House of Deputies, the members of each being chosen by universal suffrage. The Roman Catholic Church is the State church, but all religions are tolerated. There is a national college and an agricultural school at Asuncion, but, as in most other South American countries, the educational system is not well developed. The inhabitants are of mixed Spanish and indian blood, besides the native indians, many of whom are civilized.

The chief cities are Asuncion, the capital, Paraguari and Villa Rica.

Paraguay was originally a Spanish colony, the first settlement being made in 1535. In 1608 a number of Spanish Jesuits established a powerful and well-organized government, which lasted till 1758, when it was overthrown by the Brazilians and Spaniards. Early in the present century its isolated position enabled it by a single effort to emancipate itself from Spanish rule. Doctor Francia, secretary to the revolutionary junta in 1811, was elected consul, but exchanged the name for that of dictator in 1814, and thenceforward, by a rigorous system of espionage and the strict prohibition of all intercourse with other nations, he retained his position till his death in 1840. In 1844 Don Carlos Antonio Lopez was elected president for ten years, and soon after, the country was declared free and open, to both foreigners and foreign commerce. Don Carlos Lopez remained president of Paraguay till his death in 1862, when he was succeeded by his son Don Francisco, who concluded treaties of commerce with the United States and the leading European nations and did all in his power to promote the growth of agriculture and industry in the land. But a disastrous war with Brazil and the Argentine Republic, which broke out in 1864 and only closed with the death of Lopez in 1870, caused the death of far the greater portion of the male adults and entirely checked the progress of Paraguay. A popular constitutional government has since been established, and the state is now making rapid progress in population and prosperity. Population in 1910, estimated 700,000, of whom 100,000 were indians.

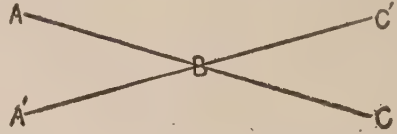
Paraguay, a river of South America, which rises in the State of Matto Grosso, in Brazil,

Paralysis

flows in a generally southeasterly direction and joins the Paraná, after a course of almost 1500 miles. It receives the Pilcomayo, Vermejo and other large rivers and is a valuable highway of trade for Paraguay and Brazil.

Paraguay Tea. See MATE.

Parallax. If a person at A, in the figure, looked at an object at B, it would appear in a line with an object at C. But if he moved to A', the



object at B would appear to move, and in an opposite direction, till it came in a line with C'. This seeming backward motion of B is called *parallax*. The angle ABA' is the *angle parallax*. In astronomy, parallax is generally used to indicate the differences in direction of a heavenly body seen from the center of the earth and seen from a point on its surface. The heavenly bodies are always located in astronomical calculations as they would be seen from the center of the earth. As the angle of the parallax depends upon the distance of the body from the observer, the astronomer can, by the aid of trigonometry, measure the distance of the heavenly bodies from the earth.

Parallelogram. See QUADRILATERAL.

Parallelogram of Forces, an important principle of dynamics, discovered by Newton, which may be stated thus: If two forces, acting in different directions on a body at the same time, be represented in magnitude and direction by two straight lines meeting at the body, their resultant effect, in giving motion to the body, is that of a force represented in magnitude and direction by the diagonal of the parallelogram of which the two former lines are two sides. See COMPOSITION OF FORCES.

Paralysis, the impairment or loss of the power of motion. This loss may affect certain parts of the body only, or it may cover one side of the body, or the upper or the lower half, or it may be general and affect both upper and lower extremities. Sometimes there is a loss of motion, while sensibility is retained; and rarely, there is a loss of sensibility, while the power of motion is retained. Paralysis is not a disease, but is a manifestation of disease, usually in a part of the body remote from that affected by paralysis; as, for instance, a wound or a disease of a nerve trunk may cause paralysis in the extremities

to which that trunk leads. The ordinary form of apoplexy or paralytic stroke is accompanied by a loss of motion on one side of the body, usually in the extremities and in the muscles of the face and tongue. It is frequently caused by the forming of a blood clot in the brain.

Par'amar'ibo, the capital of Dutch Guiana, about 16 mi. above the mouth of the Surinam. It is a well-built city and is the center of the Dutch West Indian trade. Its chief exports are sugar, rum, molasses and rubber. A hospital for lepers is located near the town. Population in 1910, 35,346.

Parana, *pah ra nah'*, a river in South America, the largest of the continent except the Amazon. It discharges into the estuary of the La Plata, the latter part of its course being through the Argentine Republic. Its length from its source to its junction with the Paraguay, its principal tributary, is about 1800 miles, and its length from the confluence to the formation of the La Plata estuary is about 850 miles more. The Parana is an important waterway to the interior of the country, though it has obstructions at certain points.

Par'asites, a name applied to animals or plants which attach themselves to others and draw nourishment from their hosts. Some animal parasites inhabit organs in the bodies of other animals, while others live upon the exterior of the body. Among the former are tapeworms and flukes, and among the latter, lice and ticks. While true parasites obtain their nourishment from the animals on which they live, there are other plants and animals, to which the name is sometimes given, that obtain only a lodging at the expense of the animals or plants which they accompany. Such a life seems to be that of the lichen. One of the common vegetable parasites is the mistletoe.

Parasit'ic Diseases, diseases produced by parasitic animals or plants. See BACTERIA AND BACTERIOLOGY.

Parcel Post, the name given to that branch of the postoffice system which transmits merchandise and printed matter, except periodicals. In the United States the parcel post was inaugurated on January 1, 1913. The law which authorized this service was passed on August 24, 1912. The parcel post differs from the former fourth class matter in two important particulars: first, in the weight and size of the package and the character of the contents; second in the use of distance as a factor in determining the rate of postage. The old law limited the weight of

packages to four pounds and made 1 cent an ounce the rate of postage. The new law provided that packages may weigh not more than 11 pounds, and may not exceed 72 inches in length and girth combined. On August 15, 1913, the weight limit was raised to 20 pounds within the first and second zones, and on January 1, 1914, it was raised to 50 pounds within the first two zones and to 20 pounds in the other zones. All matter, including farm and factory products, not included in the first three classes of mail matter, may be sent by parcel post. Explosives of every kind, intoxicating liquors, live or dead animals, articles having a bad odor, or any articles objectionable in themselves or dangerous to handle will not be received as mail matter. Ordinary postage stamps are now used to prepay matter, though formerly special stamps were required. Parcels may be sent by special delivery, may be insured, and may be sent collect on delivery. Below is a table giving the rates of postage for the parcel post.

Weight	First Zone	Second Zone	Third Zone	Fourth Zone	Fifth Zone	Sixth Zone	Seventh Zone	Eighth Zone
1 lb.	\$0.03	\$0.03	\$0.03	\$0.07	\$0.05	\$0.05	\$0.11	\$0.12
2 lbs.	.03	.03	.03	.11	.14	.17	.21	.24
3 lbs.	.06	.07	.10	.15	.20	.25	.31	.36
4 lbs.	.07	.08	.12	.19	.26	.33	.41	.48
5 lbs.	.07	.09	.14	.23	.32	.41	.51	.60
6 lbs.	.08	.10	.16	.27	.38	.49	.61	.72
7 lbs.	.08	.11	.18	.31	.44	.57	.71	.84
8 lbs.	.09	.12	.20	.35	.50	.65	.81	.96
9 lbs.	.09	.13	.22	.39	.56	.73	.91	1.08
10 lbs.	.10	.14	.24	.43	.62	.81	1.01	1.20
11 lbs.	.10	.15	.26	.47	.68	.89	1.11	1.32
12 lbs.	.11	.16	.28	.51	.74	.97	1.21	1.44
13 lbs.	.11	.17	.30	.55	.80	1.05	1.31	1.56
14 lbs.	.12	.18	.32	.59	.86	1.13	1.41	1.68
15 lbs.	.12	.19	.34	.63	.92	1.21	1.51	1.80
16 lbs.	.13	.20	.36	.67	.98	1.29	1.61	1.92
17 lbs.	.13	.21	.38	.71	1.04	1.37	1.71	2.04
18 lbs.	.14	.22	.40	.75	1.10	1.45	1.81	2.16
19 lbs.	.14	.23	.42	.79	1.16	1.53	1.91	2.28
20 lbs.	.15	.24	.44	.83	1.22	1.61	2.01	2.40

For parcels above 20 pounds, in the first two zones, the rate increases in the same proportion until the 50-pound limit is reached.

Parcels are mailable only at main postoffices, branch postoffices and specially designated substations. The accompanying map shows the division into zones and the basic units of area.

Beginning March 16, 1914, books were admitted to the parcel post, at the rate of 1 cent for each 2 ounces or fraction thereof on books weighing 8 ounces or less, and at regular zone parcel post rates on those in excess of that weight.

A parcel post system was introduced in Canada early in 1914.

Pardon, the remission of the penalty of a crime or offense. In the United States, the pardoning power is lodged in the president and the governors of the various states and extends to all offenses except those which are punished by impeachment after conviction. In some states, concurrence of one of the legislative bodies or a pardoning board is required.

Parent and Child. This relation has both a natural and a legal aspect, the latter, arising out of marriage, being the one considered in this article. The common law does not compel parents to maintain their children. Where the child contracts a necessary debt, as for food, the parents will usually be held liable. The common law provided that the father should have the children under his power until their majority; but it is now possible for the mother, in case of separation of the parents, to apply to the courts for rights of access and custody while the children are under sixteen years of age.

Parhe'lon, a mock sun, having the appearance of the sun itself and seen by the side of that luminary. Parhelia are sometimes double, sometimes triple and sometimes more numerous. They appear at the same height above the horizon as the true sun, and they are always connected with one another by a white circle or halo. They are the result of certain modifications which light undergoes when it falls on crystals of ice, rain drops or minute particles that constitute clouds. See CORONA; HALO.

Paria, *pah're a*, GULF OF, an inlet of the Atlantic, on the northeast coast of South America, between the island of Trinidad and the mainland of Venezuela. It has good anchorage and receives several arms of the Orinoco.

Par'is, in Greek mythology, the son of Priam and Hecuba. His mother dreamed before his birth that she had brought forth a firebrand, and having been informed by the priests that this meant that her son should cause the destruction of Troy, she had the child exposed on Mount Ida to die. Here, however, he was found by a shepherd, who brought him up as his own son. When he grew to young manhood, his great beauty won him the love of the nymph Oenone, whom he married. They were happy together until, one day, Paris was called to decide a beauty contest between Juno, Minerva and Venus, all of whom claimed the apple which, marked "For the fairest," was thrown into their midst (See APPLE OF DISCORD). Each of the goddesses promised to Paris a reward if he would decide in her favor, but the

offer of Venus of the most beautiful woman in the world as his wife was most to his taste, and he awarded the prize to her. While on a visit to Greece, Paris was entertained at the home of Menelaus, king of Sparta, whose wife, Helen, the most beautiful woman of her time, he treacherously made love to and carried off. This act caused the Trojan War. After the capture of the city he killed Achilles by shooting him in the heel, and he was himself killed by Philoctetes. See HELEN; TROY.

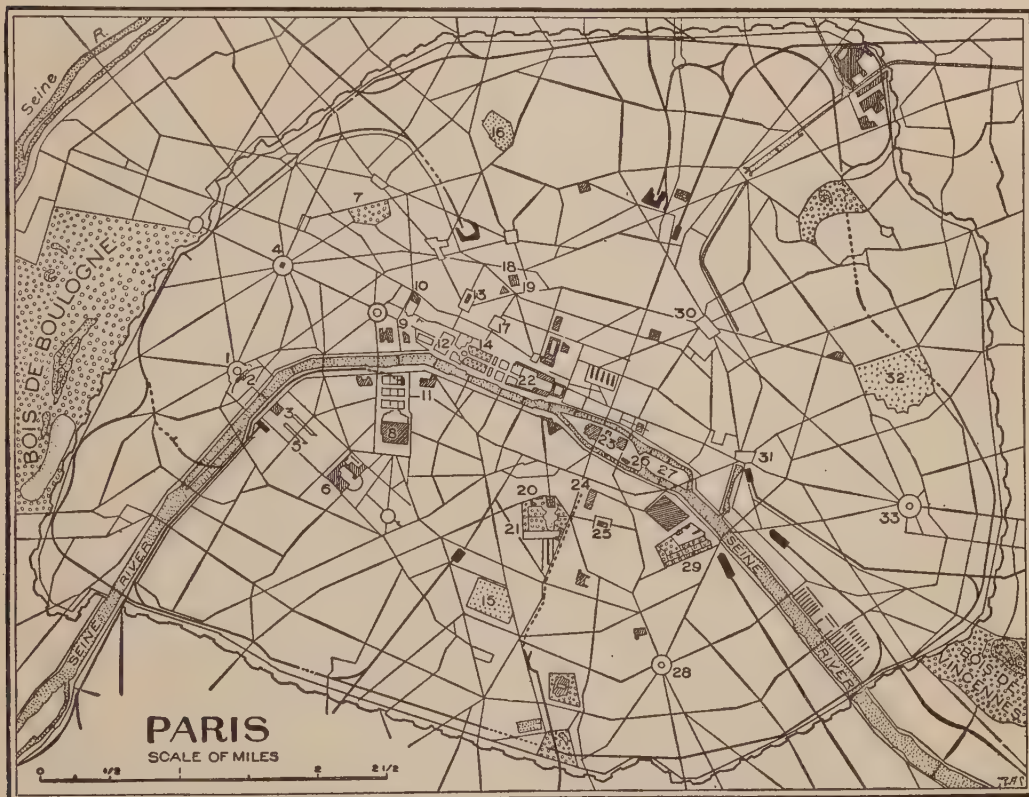
Paris (Fr. pron., *pa re'*), the largest city of France, and the capital of the French Republic, located on the Seine River, 110 mi. from its mouth. The city proper occupies a level plain on both sides of the Seine and is surrounded by hills, some of which rise to a height of more than 200 feet. A wall 21 miles long surrounds the city and encloses some of the fortified hills. The wall is pierced by numerous gates, but is strongly fortified and has a glacis and a moat on its outside. Taken altogether, the defenses of Paris are almost impregnable. The city grew up without a definite plan and contained a dense population, living in crowded houses on narrow crooked streets, but within the last century the city has been remodeled, wide avenues have been opened in every direction, and communication is rendered direct and easy by numerous street car lines and omnibuses. Besides these, Paris has a system of underground street railways that is as perfect in appointment and management as any in the world. As a whole it is one of the most beautiful cities of the world, and though in its reconstruction thousands of people suffered from the arbitrary opening of streets and the destruction of old buildings, yet the roomy avenues, the perfect sanitation and the magnificent appearance of the new city have justified the action of its builders. The Seine is a great thoroughfare for trade and commerce, and its sides are lined with magnificent stone quays, which keep its water within bounds and furnish landing stages and broad esplanades for pleasure and trade. Near the center of the city the Seine divides into two streams and creates the Ile de la Cité, which is covered with fine public buildings. The river, which varies from 300 to 500 feet in width, is spanned by more than 30 magnificent bridges, one of which has been in existence for over 400 years and others for more than 300 years. Many of the bridges are adorned with historical relics or with statuary designed to commemorate great events.

Paris

Steam and electric roads connect Paris with its numerous famous suburbs—Boulogne and its famous park and race courses; Versailles, with its palace and beautiful gardens; Saint-Denis, with its cathedral where the kings of France are buried, and a score of others near and farther, each full of historic or artistic interest (See VERSAILLES, PALACE OF; SAINT-DENIS; BOIS DE BOULOGNE). The railroads

Paris

of traffic. In the northwest is the Place de l'Etoile (Place of the Star), whence radiate twelve great avenues, chief among which is that of the Champs Elysées, running southeast, under slight changes of direction and name, to the Place de la Bastille, where it meets other diverging streets, one of which continues in the same general direction to the Place de la Nation. The Champs Elysées proper terminates in the



1, Place du Trocadero; 2, Palais du Trocadero; 3, Tour Eiffel; 4, Place de l'Etoile; 5, Champ de Mars; 6, Ecole Militaire; 7, Park Monceau; 8, Hotel des Invalides; 9, Champs Elysées; 10, Palais Elysée; 11, Chambre des Députés; 12, Place de la Concorde; 13, La Madeleine; 14, Jardin des Tuileries; 15, Montparnasse; 16, Montmartre Cemetery; 17, Place Vendome; 18, Opera; 19, Place de l'Opera; 20, Palais du Luxembourg; 21, Luxembourg Gardens; 22, Palais du Louvre; 23, Ile de la Cité; 24, Sorbonne; 25, Pantheon; 26, Notre Dame; 27, Ile St. Louis; 28, Place de la Italie; 29, Jardin des Plantes; 30, Place de la Republique; 31, Place de la Bastille; 32, Pere Lachaise; 33, Place de la Nation.

which connect Paris with the other cities of Europe are numerous and well equipped. They enter the city from different quarters and terminate in fine stations, no less than nine in number, all of which are easily reached by the street and underground railways.

STREETS, PARKS AND BOULEVARDS. A glance at the map will make clear the systems of boulevards and wide streets which radiate from common centers and form the chief arteries

Place de la Concorde, which once streamed with the blood of the Revolution and is famous for many other important occurrences. Beyond is the garden of the Tuileries, now the beautiful playground of crowded Paris, and still farther, the Palace of the Louvre, with its wonderful treasures of art and history. Across the river to the south of the Champs Elysées are the spacious grounds of the Hotel des Invalides, which almost meet the Champ de Mars and the

wide tract that faces the Palace of the Trocadero, on the north side of the river. South of the river, also, are the charming gardens of the Luxembourg, and farther east, next the river, is the Jardin des Plantes (botanical garden), with its marvelous living collection of plants from all parts of the world. In the northeastern part of the city is the beautiful park of the Buttes Chaumont, where advantage has been taken of high hills and deep ravines to make a most delightful garden. Just outside of the city, to the west, is the Bois de Boulogne, a magnificent park, much of which is still in its natural state, where great trees shadow acres of hillside, interspersed with meadows, lakes and gardens. Among them all run the beautiful drives and charming walks that have made this park famous for many years. Across the city, at the southeast, is the Bois de Vincennes, a smaller, but almost equally beautiful, tract. The cemetery of Montparnasse, in the southern part of the city, and the cemetery of Père Lachaise, in the east, are beautifully kept and attract many visitors to the graves of the famous people buried there.

PUBLIC BUILDINGS, MONUMENTS AND INSTITUTIONS. Paris has long been famed for the magnificence of its churches, palaces and other public buildings. Chief of these is the great Palace of the Louvre, located on the north bank of the Seine, almost in the center of the city (See LOUVRE). Directly south of it, and some distance from the opposite side of the river, is the Palace of Luxembourg, once a royal residence, but now the home of great collections of modern paintings and statuary. The Palace of the Trocadero fronts the Seine on the north bank. It is a huge oriental building, in front of which is a great ornamental fountain. The palace was built in 1878 for the International Exposition, and it still contains many treasures of sculpture and ethnology. Across the river is the Eiffel Tower (See EIFFEL TOWER), and the Champ de Mars, where have been erected the buildings for other international expositions. The Hotel des Invalides has been in existence since 1670 and serves as a home for disabled soldiers. In connection with it is a military museum, with a fine collection of relics. The president of France makes his official home in the Palais de l'Elysée, northwest of the Place de la Concorde, while across the river, south of the square, is the building of the Chamber of Deputies. On the Ile de la Cité is the Palace of Justice, where the law courts are held; it is

famous for its prison, the Conciergerie, within which Marie Antoinette, Robespierre and other famous personages of the Revolution were confined. North of the island is the Hotel de Ville (City Hall). Many other elegant public buildings, including the palaces, schools, hospitals and charitable institutions, are located in different parts of the city.

Among the churches the chief is the Cathedral of Notre Dame, situated on the Ile de la Cité (See NOTRE DAME, CATHEDRAL OF). The Madeleine, a modern structure, is a handsome imitation of a Greek temple, and within, it is gorgeously decorated. The Pantheon, which was built originally as a church, is now considered solely as a memorial to the great men of France. The Grand Opera House, which covers nearly three acres of ground, is a magnificent structure that cost about \$5,500,000. The chief educational institution is the University of France, which now occupies a large building quite in keeping with other great colleges of the world. In the vicinity of the Sorbonne, which was the name of the building occupied by the old University of France, are the College of France, the Schools of Medicine and Law, the Observatory, the Ecole Polytechnic and the Jardin des Plantes. The Bibliotheque Nationale (National Library) contains nearly 2,750,000 volumes, besides surpassingly great collections of manuscripts, coins and historic relics of various kinds. The art collections of Paris are the pride of France and have been gathered from all parts of Europe. No other city can surpass Paris in the value and interest of these collections.

In the parks and public places of Paris are many fine monuments of various kinds. Besides the statuary which has been erected in memory of famous Frenchmen, there are several very pretentious and remarkable monuments that deserve special mention. In the Place de l'Etoile is the largest triumphal arch in existence. As it is located on a slight eminence, it is visible from almost every part of Paris (See ARC DE TRIOMPHE DE L'ETOILE). In the center of the Place Vendome rises a column 142 feet high, built in imitation of Trajan's column at Rome. On it are represented memorable scenes of the wars of 1805, down to the Battle of Austerlitz. At the top is a statue of Napoleon in his imperial robes. The granite obelisk in the center of the Place de la Concorde once stood in front of the gateway to the great Temple of Luxor, in Upper Egypt. In 1831 this was presented to Louis Philippe by Mohammed Ali, then viceroy



PARIS, FROM THE RIVER SEINE

Paris

of Egypt. The monolith, thickly inscribed with hieroglyphics that tell of the exploits of Ramesses II, is reddish granite, from the quarries of Assuan, and is 76 feet high. It rests on a pedestal of French granite 13 feet high. The location of the Bastille, the famous old prison which was destroyed in the Revolution, is marked by a bronze column resting on a base which makes the whole monument 154 feet in height (See JULY, COLUMN OF).

GOVERNMENT. Paris is under the national government, and its chief executive is the prefect of the Seine, appointed by the government. A town council, of which there are 80 members, four from each of the twenty wards or districts of the city, is chosen by the people. Each of the twenty districts, or *arrondissements*, has a mayor and two assistant councilors and is to a certain extent an independent organization, as it assesses and collects its own taxes and administers most of its ordinary affairs, subject, however, to the control of the municipal council. The city is well regulated and policed, and its streets are kept marvelously neat and clean. Many of the public utilities are owned and operated by the city. The tendency is toward municipal ownership of all. Paris has an excellent school system, which provides for the education of its children from the time they are infants until they have passed through high school and are ready for entrance to university or college. Attendance is not compulsory in all schools, but a certain amount of education is required of every child. The control of so many public enterprises and utilities makes the annual expenses of Paris enormous. Although there is an exceedingly heavy debt against Paris, yet the city is prosperous and is paying the debt at a reasonable rate.

COMMERCE AND INDUSTRY. Paris has some large manufacturing establishments, and more are coming into existence, but its chief importance has been in the great number of comparatively small factories or workshops, in which small and elegant articles of all kinds are made in the choicest manner. No other city in the world equals Paris in the excellence and varied character of its objects of art and luxury—perfumes, gloves, artificial flowers, toys, jewelry, botanical and surgical instruments and a host of articles that a luxury-loving world enjoys. Paris is the commercial metropolis of France and has an enormous trade in manufactured articles with the rest of the world. Its stores, many of which are large and on the department

Paris

plan, are filled with choice articles, which are bought not only by Parisians but by visitors from all over the world, for Paris is and long has been the center of tourist travel from everywhere. The people are still drawn there in great numbers by the beauty of the city, the excellence and varied character of its shops, its treasures of art and the lightness and gaiety of its pleasures.

HISTORY. A village of the Gauls was located on the present site of Paris as early as the time of Julius Caesar, for he mentions it in his *Commentaries*. About 250 A. D. Saint Denis introduced Christianity among the Gauls, and by the fourth century the name *Paris* had taken the place of *Lutetia*, the name of the village before that time. It was not until the sixth century that Paris was chosen by Clovis as the seat of his government. After the tenth century, when Hugh Capet chose it as the capital of the French monarchy, Paris continued steadily to grow in influence and importance. Many of the kings of France contributed to the embellishment of the city, building bridges and quays and establishing palaces and buildings for the treasures of art and literature. The numerous revolutions which marred its progress resulted in the destruction of some notable buildings, but, in spite of all, the city never appeared to go backwards, and even the destructive revolutions appeared to lend themselves to improvements, convenience and beauty. The occupation of Paris by the Germans in 1871 was a great blow to the pride of the French, but after the evacuation, Paris rapidly regained its influence as the capital of cosmopolitan Europe. In 1914 the Germans reached Lagny, only 17 miles from Paris, before they were driven back. The seat of government was meanwhile transferred to Bordeaux. See WAR OF THE NATIONS.

POPULATION. At the beginning of this century the population of Paris was about 714,000. In 1880 it had increased to 2,269,000, and in 1911 it was 2,888,110. It is one of the most densely populated cities in the world and has two and one-half times as many people to the square mile as London. Perhaps one-tenth of the population is composed of foreigners, representing most of the nations of Europe. The Roman Catholic religion prevails, but there are more than 500,000 Protestants.

Paris, ILL., the county-seat of Edgar co., 20 mi. n. w. of Terre Haute, Ind., on the Vandalia and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. The city is a resi-

dence place in a farming district, producing corn, wheat and broom corn. There are also extensive manufactures of brooms, flour and other articles. The city has a public park of 100 acres and owns and operates the waterworks and electric light plant. It was laid out in 1825 and was incorporated in 1849. Population in 1910, 7664.

Paris, KY., the county-seat of Bourbon co., is situated on Stone Creek, and on the Louisville & Nashville and the Frankfort & Cincinnati railroads, 19 mi. n. e. of Lexington. The city has a fine court house. The leading industries include breeding fine horses and a thriving trade in tobacco, grass seed, hemp and whiskey. Population in 1910, 5859.

Paris, TEX., the county-seat of Lamar co., 100 mi. n. e. of Dallas, on the Frisco, the Atchison, Topeka & Santa Fé, the Texas & Pacific and other railroads. The city is in a rich farming region, producing cotton, corn, oats, alfalfa, fruits and vegetables. It contains cottonseed oil mills and oil refineries, iron foundries, brick works and other factories. The city has a fine Federal building, a hospital, a county courthouse and a poor-farm. There are three national banks, two telephone systems, an electric street railway, electric lights, municipal waterworks and a good sewerage system. The place was settled in 1841. Population in 1910, 11,269.

Paris, LOUIS ALBERT PHILIPPE D'ORLEANS, Count of (1838-1894), son of the duke of Orleans and grandson of Louis Philippe. His father died in 1842, and he thus became heir apparent to the throne. During the American Civil War of 1861, he volunteered in the Northern army and served for some time on the staff of General McClellan. He published a *History of the Civil War in America*.

Paris, TREATIES OF, the name given to several important treaties of peace, concluded at Paris. The first Treaty of Paris was signed in 1763 and closed the Seven Years' War. By it France ceded to Great Britain, Canada, Prince Edward Island, Cape Breton and all French territory east of the Mississippi River except New Orleans. Great Britain restored to France some of her conquests in the West Indies, but received, in return, territory in India. Spain ceded Florida to Great Britain, and France gave up to Spain, Louisiana, with New Orleans. The importance of this treaty lay in the fact that it established British supremacy in Canada and in India. The second Treaty of Paris,

signed September 3, 1783, was concluded between the United States and Great Britain at the close of the American Revolution. Great Britain recognized the independence of the colonies, which were to have possession of the territory as far west as the Mississippi River, between the Great Lakes and the thirty-first parallel of north latitude. It was provided that the Americans might retain their share in the fisheries at Newfoundland and have the exclusive right of fishing on their own coasts. To compensate the British loyalists for the confiscation of their property during the war, it was agreed that Congress should recommend to the state legislatures to restore confiscated estates and to undertake no prosecutions against the loyalists. Great Britain and the colonies were both to have free navigation of the Mississippi. At the same time Great Britain made peace with France and Spain, restoring Florida and Minorca to Spain and ceding Tobago to France.

In May, 1814, was concluded the third Treaty of Paris, between France and the great powers of Europe. The conquests which France had made under Napoleon were taken from her, but she was not compelled to pay an indemnity, nor to restore the works of art which had been brought from conquered countries. The House of Orange regained possession of Holland; Great Britain kept Ceylon and the Cape of Good Hope; the independence of Switzerland was recognized, and it was provided that Italy and Germany should consist of independent small states. All other questions, the treaty provided, were to be settled by a congress of the powers, to be held at Vienna. In November of the following year another treaty was concluded at Paris between France and the great powers, and by this, France, for her acceptance of Napoleon after his first abdication, was punished by having to pay an indemnity of about \$200,000,000 and to submit to occupation by a foreign army.

By a Treaty of Paris signed in March, 1856, the Crimean War was closed. One of the most important provisions of this treaty was that no war vessel should ever enter the Black Sea, which should be open to merchantmen of every nation. It was also provided that Turkey should be recognized as one of the powers of Europe, and that no other nation had a right to make attempts against its integrity. Russia gave up her protectorate over Moldavia and Wallachia, which were left under the control of the porte.

Paris

The treaty which closed the Spanish-American War was signed at Paris, December 10, 1898, and by it Spain gave up her authority over Cuba, and ceded Porto Rico, the Philippine Islands and Guam to the United States. The United States in turn paid to Spain the sum of \$20,000,000.

Paris, UNIVERSITY OF, one of the oldest and largest universities in the world, located in Paris. It had its origin in a number of schools which became prominent during the twelfth century. Because of a serious conflict which arose between the students and citizens in 1229, a large number of students emigrated to Oxford, but two years later the old differences were settled through the influence of Pope Gregory IX, and most of the students returned. From this time on the university rapidly gained in influence. It attained its highest development during the fourteenth and fifteenth centuries, at which time it was the educational center of Europe and of the Christian world as well. Its decline was due to the establishment of schools of theology in other parts of Europe and to the political dissensions which culminated in the French Revolution. During this struggle the institution was overthrown, but it was reorganized by Napoleon in 1808 as a part of the University of France. The present organization contains the council of the university, the Protestant theological faculty, the medical faculty, which includes the Dupuytren Museum, the law faculty, faculties of science and letters, located at Sorbonne, and the school of pharmacy. The library numbers about 418,000 volumes, and there are over 12,000 students in all departments.

Park, MUNGO (1771-1806), an African traveler, born near Selkirk, in Scotland. In 1793 he was engaged by the African Society to trace the course of the Niger. He reached the Gambia at the end of 1795 and, advancing northeastward, arrived at the Niger near Sego. He shortly returned, but in 1805 he accepted command of a government expedition to the Niger. While floating in canoes down the river, his small party was attacked by the natives, and in their efforts to escape, Park and all of his companions were drowned.

Park City, UTAH, a city in Summit co., 30 mi. s. e. of Salt Lake City, on the Union Pacific and the Rio Grande & Western railroads. It is in a rich silver-mining district and contains large sampling works, quartz mills and other factories. There is beautiful mountain scenery, and the near-by lakes afford good trout fishing. Population in 1910, 3439.

Parker

Parker, ALTON BROOKS (1852-), an American lawyer, jurist and politician, born at Cortland, N. Y., educated at the public schools, the Cortland Academy, Cortland Normal School and the Albany Law School. After being admitted to the bar, he practiced in Kingston, and in 1877 he became surrogate of Ulster County. He took an active part in Democratic politics and was offered a high administrative position under Cleveland. In 1885 he was made a judge of the New York supreme court; four years later he became a member of the court of appeals, and in 1898 he was raised to the position of chief justice of that court. In 1904 he was the Democratic nominee for president of the United States, but was defeated, and he returned to the practice of law.

Parker, FRANCIS WAYLAND (1837-1902), an American soldier and educator, born at Bedford, N. H. He was educated in the public schools and at an academy and began teaching at an early age. At the breaking out of the Civil War, he entered the Union army as a private, but received several promotions and finally became colonel of the Fourth New Hampshire Volunteers. On retiring from the army, he resumed his former vocation and became principal of a grammar school in New Hampshire. He was soon after chosen principal of a normal school in Manchester, Ohio, and later he became superintendent of public schools in Quincy, Mass. His work in Quincy brought him into prominence as an educator. He conducted his school largely on the methods and principles of Pestalozzi (See PESTALOZZI, JOHANN HEINRICH), and the system which he developed was entirely different from anything that had before been attempted in the United States. Later Colonel Parker became one of the supervisors of the Boston public schools, and in 1883 he was elected president of the Cook County (Illinois) Normal School, which position he retained for thirteen years, when he became president of the Chicago Institute, a school founded by Mrs. Emmons Blaine for the training of teachers. Later the institute was consolidated with the University of Chicago, becoming the University School of Education. Colonel Parker was made director of this school, and while laboring to organize it on a new and broader foundation, he suddenly died. He was one of the leaders in the advanced educational movement in the United States. He was opposed to all formalism in teaching and was an advocate of what he termed a natural method. He was the author of *Talks on Teaching*,

Quincy Methods, How to teach Geography and numerous other works on education.

Parker, GILBERT, SIR (1862–), a Canadian novelist. He was born at Camden East, Ontario, Canada, and was educated at Trinity College, Toronto. He spent several years in Australia and traveled extensively among the South Sea Islands and in northern Canada. He finally made his home in England, became a



SIR GILBERT PARKER

member of Parliament and was knighted in 1902. He is the author of about twenty works of fiction, besides a book of travel, entitled *Round the Compass in Australia*, and a volume of poetry, called *A Lover's Diary*. Among his works of fiction are *The Battle of the Strong*, *Donovan Pasha* and *Some People of Egypt*, *The Right of Way*, *A Ladder of Swords*, and *The House of Judgment*.

Parker, HORATIO WILLIAM (1863–), an American composer, born at Auburndale, Mass. He studied with the best teachers in America and attended the conservatory at Munich. After his return he accepted several important appointments as organist in New York and Boston churches and in 1894 became professor of music at Yale. Among his best works is the oratorio *Hora Novissima*, which has been produced under the composer's direction in both England and America with great success. In 1911 he was awarded a prize of \$10,000 by the Metropolitan Opera Company for his opera *Mona*.

Parker, THEODORE (1810–1860), an American divine, born at Lexington, Mass. He stud-

ied at Harvard University and in 1837 was settled as a Unitarian preacher at West Roxbury. Although his doctrine was accounted heterodox, yet such was his eloquence and ability that he soon became famous as a preacher and lecturer in New England. In 1843 he visited England, France, Italy and Germany, and he settled as a preacher in Boston on his return. He was a prominent advocate of the abolition of slavery.

Parkersburg, W. VA., the county-seat of Wood co., 98 mi. s. w. of Wheeling, on the Ohio River, at the mouth of the Little Kanawha, and on the Baltimore & Ohio and other railroads. The city is in a fertile agricultural region and has a considerable trade. There are also oil and gas wells, coal mines, clay beds and several medicinal springs. The various industrial establishments include lumber mills, iron foundries, machine shops, chair and furniture factories, oil refineries, breweries, flour mills and other establishments. The city is regularly laid out from the water's edge of both rivers. A railroad bridge, one and one-third miles long, crosses the Ohio, and the city has a fine park and a public library. Some of the prominent structures are the McKinley School, the Academy of Visitation, Saint Joseph's Hospital, the Federal building, the courthouse and the city hall. Near the city is the island where Harman Blennerhassett once lived (See **BLANNERHASSETT, HARMAN**). Parkersburg was settled in 1773 and was chartered as a city in 1863. Population in 1910, 17,842.

Parkman, FRANCIS (1823–1893), an American historian. He was born in Boston, graduated at Harvard in 1844, studied law for two years, traveled in Europe and returned to explore the Rocky Mountains. The hardships he endured among the Dakota Indians seriously injured his health, yet in spite of this and defective sight, Parkman worked his way to recognition as an authority on the period of the rise and fall of French dominion in America. He paid seven visits to France to examine archives. Among his books are *California and the Oregon Trail*; *The Conspiracy of Pontiac*; *Pioneers of France in the New World*; *The Book of Roses*; *The Jesuits in North America*; *LaSalle and the Discovery of the Great West*; *The Old Régime in Canada*; *Count Frontenac and New France under Louis XIV.*, and *Montcalm and Wolfe*. (See illustration on next page.)

Parlement, pahr le maN', the name assumed by a number of local bodies in France prior to the Revolution. The most important was

Parliament

the Parlement of Paris, which was the result of a long evolution from a body which originated in the times of the earliest Frankish kings. There were others at many of the leading cities. The functions of the parlements were chiefly judicial, though they had a sort of legislative and



FRANCIS PARKMAN

administrative power, as well. Parlements became the center of opposition to the ruling kings and were especially influential in the reigns of Louis XI and Louis XIV. Louis XV abolished the Parlement of Paris and constituted a new and somewhat different body, but the old organization was revived under Louis XVI. The Parlement of Paris and the local parlements were all abolished by the National Assembly in 1790. Their historical importance lies in their influence upon later judiciary tribunals in France and throughout the world. They did much to summarize and unify the common law, and, in dispensing justice, were notably free from prejudice and party influence.

Parliament, *pahr'ly ment*, an assembly of persons in conference upon public affairs; especially, the law-making branch of a government, and, specifically, the national assembly of the British nation, embracing two branches, the House of Lords and the House of Commons. The former is made up of two classes: (1) the *lords temporal*, comprising the hereditary peers and others from time to time created by the

Parliamentary Law

Crown; (2) the *lords spiritual*, or the clergy of the Anglican Church. The House of Commons consists of representatives of the whole people, chosen by districts. The sovereign is technically an element of Parliament, but in reality he exercises his right only in the signing and vetoing of bills. The authority of Parliament extends over the United Kingdom and all its possessions. See LEGISLATURE; GREAT BRITAIN, subhead *Government*.

Parliamentary Law, those rules by which most deliberative assemblies agree to be governed. Their purpose is to facilitate the transaction of business and the free and orderly discussion of questions. The chief duty of the presiding officer of an assembly is to preserve order and enforce the rules of debate and procedure by which the assembly is to be governed. The first principles of parliamentary law are that all business must be brought before the assembly through a *motion* or *resolution*, and that only one person has the right to speak at one time. The presiding officer usually recognizes the one who rises first, though it is within his discretion to recognize any other, for special reasons. It is usually customary to require a *second* to every important motion, in order to show that it has the support of more than one member. The motion is then stated by the chairman, and the maker of the motion has the right to speak in its behalf. The question is then thrown open for general discussion, and the general rule is that no other question can be considered while the first question is under discussion. However, there are certain classes of motions which take precedence of all others. The first class, called *subsidiary motions*, are used to suppress or postpone the discussion of a question. Among these is the motion to *lay the motion on the table*, that is, to postpone it until it can be taken up by the consent of the assembly. This motion cannot be debated. The second subsidiary motion is the request of the *previous question*, which stops all debate and orders the question submitted to a vote. The motion for the previous question requires two-thirds for its adoption. A third subsidiary motion is the motion to *postpone to a certain time*. The fourth subsidiary motion is to *commit*, that is, to refer to a committee. A motion may be *amended* by order of the assembly; this amendment may be amended, but the amendment of an amendment cannot be amended. Finally, a motion may be *postponed indefinitely*. There are also *incidental questions*, questions of appeal, objection and suspension of the rules, which

require to be disposed of immediately upon their introduction. Finally, there are so-called *privileged questions*, including motions to fix a time for adjournment, to adjourn, to determine the rights of the assembly or of its members and to call for the regular order of business for the day. These take precedence in the order in which they are given above. All take precedence over any other question before the assembly. Voting is either by voice, those favoring a motion saying *aye* and those opposing it saying *no*; by a rising vote, or by ballot. The best manuals of rules of order are Robert's *Rules of Order* and Thomas B. Reed's *Rules of Order*.

Parma, *pahr'ma*, a city of northern Italy, capital of the Province of Parma, on the small river Parma, 72 mi. s. e. of Milan. It is almost circular in form and was formerly surrounded by a wall, the site of which is now occupied by promenades. Among the more important buildings are the cathedral, begun in the eleventh century; the baptistry; the Palazzo della Pilotta; a museum of antiquities, and a picture gallery, which contains famous works of Correggio and other great artists. The city is the seat of a university and of numerous other schools, technical, military and scientific. The manufactures, which are not of great importance, comprise, among other articles, musical instruments, felt hats, glass, tobacco, leather and iron ware. The chief trade is in wine, grain, cattle and cheese. Parma was originally an Etruscan town and became a Roman colony in the second century B. C. Population of the commune in 1911, 51,910.

Parnas'sus, a mountain of Greece, in Phocis. It has two prominent peaks, one of which was dedicated to the worship of Bacchus, the other to Apollo and the Muses. On the southern slope were situated Delphi, the Castalian fount and the Corycian caves, sacred to Pan and the Muses. The highest point is 8070 feet above sea level, and a magnificent view is obtained from the top.

Par'nell, CHARLES STEWART (1846-1891), an Irish statesman, born in the County of Wicklow, Ireland. He was educated at Cambridge, became a member of Parliament for Meath in 1875, organized the active Home Rule party and developed its obstruction tactics, and in 1879 formally adopted the policy of the newly-formed Land League, of which he was chosen president. In 1880 he was returned for the city of Cork and was chosen as leader of the Irish party. In the session of 1881 he opposed the Crimes Act and the Land Act, was arrested under the terms of the former, along with other members of his

party, and was lodged for some months in Kilmainham jail. At the general election of 1885 he was reelected for Cork, and in the next year he and his followers supported the Home Rule proposals introduced by Mr. Gladstone, while he also brought in a bill for the relief of Irish tenants. In 1887 he and other members of his party were accused by the *Times* newspaper of complicity with the crimes and outrages committed by the extreme section of the Irish Nationalist party. To investigate this charge, a commission was appointed by the government, with the result that, after a great deal of evidence was heard on both sides, a report was laid before Parliament which acquitted Parnell of all the graver charges. Parnell succeeded in collecting damages for libel from the *Times*. Shortly after this time he became involved in a scandal and lost his influence and the leadership of his party.

Par'ody, a humorous imitation of any poem. In its wider sense the word may be applied also to imitations of prose writings. Parody differs from burlesque and from travesty in that it deals with an entirely different subject from the poem imitated and resembles it only in form and expression. The following is the first stanza of Lewis Carroll's parody on Isaac Watts's well-known hymn:

"How doth the little crocodile
Improve his shining tail,
And pour the waters of the Nile
On every golden scale!"

Pa'ros, an island in the Grecian Archipelago, one of the Cyclades, 5 mi. w. of Naxos. Its greatest length is 15 miles, its greatest width 9 miles and its area about 96 square miles. The island is generally mountainous, but the soil, though often rocky, is fertile and in some places well cultivated. Corn, wine and oil are produced. Its marble has been famous from ancient times and is the material of which some of the most celebrated pieces of statuary are made. Parikia, a seaport on the northwest coast, is the chief village. Population of the island, 7740.

Par'rakeet' or **Par'roquet'**, a group of parrots, characterized by their small size and long tail-feathers. They are found in southern Asia, on the coast of Africa and throughout the Australasian region. They have very bright, contrasting colors and make showy and intelligent pets. Some may be taught to speak with considerable distinctness. One species is found within the United States, where early in the nineteenth century this Carolina parrakeet found its

way north as far as Nebraska, Wisconsin and central New York, sometimes remaining even into the winter; but because of its noisy habits and its tameness, it has been almost exterminated and now lives only in the wildest parts of the South.

Parrha'sius, a famous Grecian painter, one of the most noted artists of ancient times. He was born at Ephesus, and his father was an artist. The exact dates in the life of Parrhasius are not known, but he probably lived near the end of the fifth century B. C. It is said that he was the first to pay attention to accuracy of proportion in drawing and painting and also was the first to use light and shade to represent the contour and shape of objects. There is a myth which says that he once tortured a captive slave in order to secure a realistic reproduction of the sufferings of Prometheus. Among his famous paintings are *Athenian Democracy*, *Hermes*, *Ulysses Feigning Madness*, *Dionysus and Virtue* and many others.

Parroquet, *par'ro ket*. See **PARRAKEET**.

Par'rot, a name given to a group of climbing birds, of which there are about 350 species.



PARROT

They have hooked bills, rounded on all sides, which they use in climbing. Their legs are short and strong, and the toes are peculiarly arranged, two forward and two backward. Unlike those of most other birds, their tongues are soft and fleshy throughout their whole extent. The wings of parrots are moderate in size, but their tails are often elongated, and in some cases are used to assist in climbing. In plumage parrots are usually brilliant, and the colors are arranged in striking, and not always pleasing, contrasts. Parrots breed in hollow trees, feed on fruits and seeds and are known to live a great many years.

There are instances on record of birds that have lived to be ninety years of age. There are several genera, variously known as parrots, parakeets, macaws, lorises and cockatoos.

The *green parrot* has an orange-colored bill, cheeks and chin, with a purple band over the forehead, but otherwise it is a shining green, except that its neck-feathers are edged with black. This bird comes from the tropical regions of South America and has become a favorite pet in the United States and in Europe, because it can be taught, not only to imitate various tones of the human voice, but also actually to speak words with some intelligence. *Lovebirds* are very pretty little parrots, about six inches long, famous for their affection for each other, which they manifest in various funny ways. See **MACAW**; **COCKATOO**.

Par'ry, WILLIAM EDWARD, Sir (1790-1855), a British explorer. He joined the navy in 1806 and remained in the service until 1852. In 1819, as commander of the *Griper* and the *Hecla*, he set out on his first northern journey, and during the succeeding nine years he commanded various expeditions in search of a northwest passage and the north pole. Parry reached latitude 82° 45' N., and for forty-eight years this was the highest latitude reached.

Parsees or **Parsis**, *pahr'seez*, the name given in India to the fire-worshiping followers of Zoroaster, chiefly settled in Bombay and Surat and the vicinity, where they are among the most successful merchants. They have a great reverence for fire in all its forms, since they find in it the symbol of the good deity Ahurā-Mazda (Ormuzd). To this divinity they have dedicated "fire temples," on whose altar the sacred flame is kept continually burning. Benevolence is the chief practical precept of their religion, and it is shown in their many charitable institutions. One of the most curious of their customs is in the disposal of their dead. They build, of stone, "towers of silence," about twenty-five feet high, with a small door to admit the corpse. Inside this tower is a large pit, with a raised circular platform round it, on which the body is exposed, that the flesh may be eaten by vultures, after which the bones drop through an iron grating into the pit below and are removed to a cavern. The Parsees never eat anything cooked by a person of another religion, neither do they marry persons not of their own caste and creed. The number of Parsees in India at the census of 1911 was 100,100.

Parsis, *pahr'seez*. See **PARSEES**.

Pars'ley, a plant native to Europe, but grown extensively throughout the United States. One species, the common parsley, is a well-known garden vegetable, used for seasoning and for decorating table dishes.

Pars'nip, a plant cultivated for its root, which is long, white and tapering. The roots are freely eaten by cattle and, when cooked, by man. The quality is improved by leaving the roots in the ground during the winter and digging them early in the spring. In the eastern part of the United States parsnips have run wild to such an extent that they have become troublesome weeds. Like many other species of the parsley family, the wild parsnip is slightly poisonous, and should not be eaten. However, it is probable that cases of fatal poisoning supposed to result from eating the wild parsnips are in reality caused by the water hemlock, a different plant, whose scientific name is *Cicuta maculata*. The roots of this latter plant resemble parsnips very strongly, and the plants themselves are sufficiently alike to deceive people who are not close observers.

Par'sons, KAN., a city in Labette co., 137 mi. s. by w. of Kansas City, on the Missouri, Kansas & Texas and the Saint Louis & San Francisco railroads. A large state hospital for the insane is located here, and the other prominent buildings are the Catholic church, a Y. M. C. A. building, the railroad depot, Rasbach Hotel, Masonic Temple, the business college and the high school. Glenwood and Forrest are fine parks. There are extensive natural gas wells in the vicinity, and sandstone and limestone quarries are in operation. The city has shops and general offices of the Missouri, Kansas & Texas railroad, flour and grist mills, elevators, a handle factory, a foundry, a creamery and other works. The place was laid out and incorporated in 1871. Population in 1910, 12,463.

Parson's Cause, THE, a famous lawsuit, in which Patrick Henry first gained fame as an orator. It arose over the attempt on the part of Virginia colony to pay the salaries of clergymen either in tobacco, as had always been done before, or in colonial money. As the price of tobacco was rapidly increasing, the loss to the clergymen through payment in colonial currency was important. They appealed to the king, who promptly vetoed the statute as unconstitutional. A clergyman, Rev. James Maury, thereupon sued for damages and won his cause before the court, but Patrick Henry, who was counsel for the defendant colony, in a remarkable speech in which he declared that Virginia could legislate in regard

to her own affairs and denounced the intervention of the Crown, so moved the jury that they brought in an award of only one cent damages. This speech was one of the most important incidents in all the pre-Revolutionary struggle.

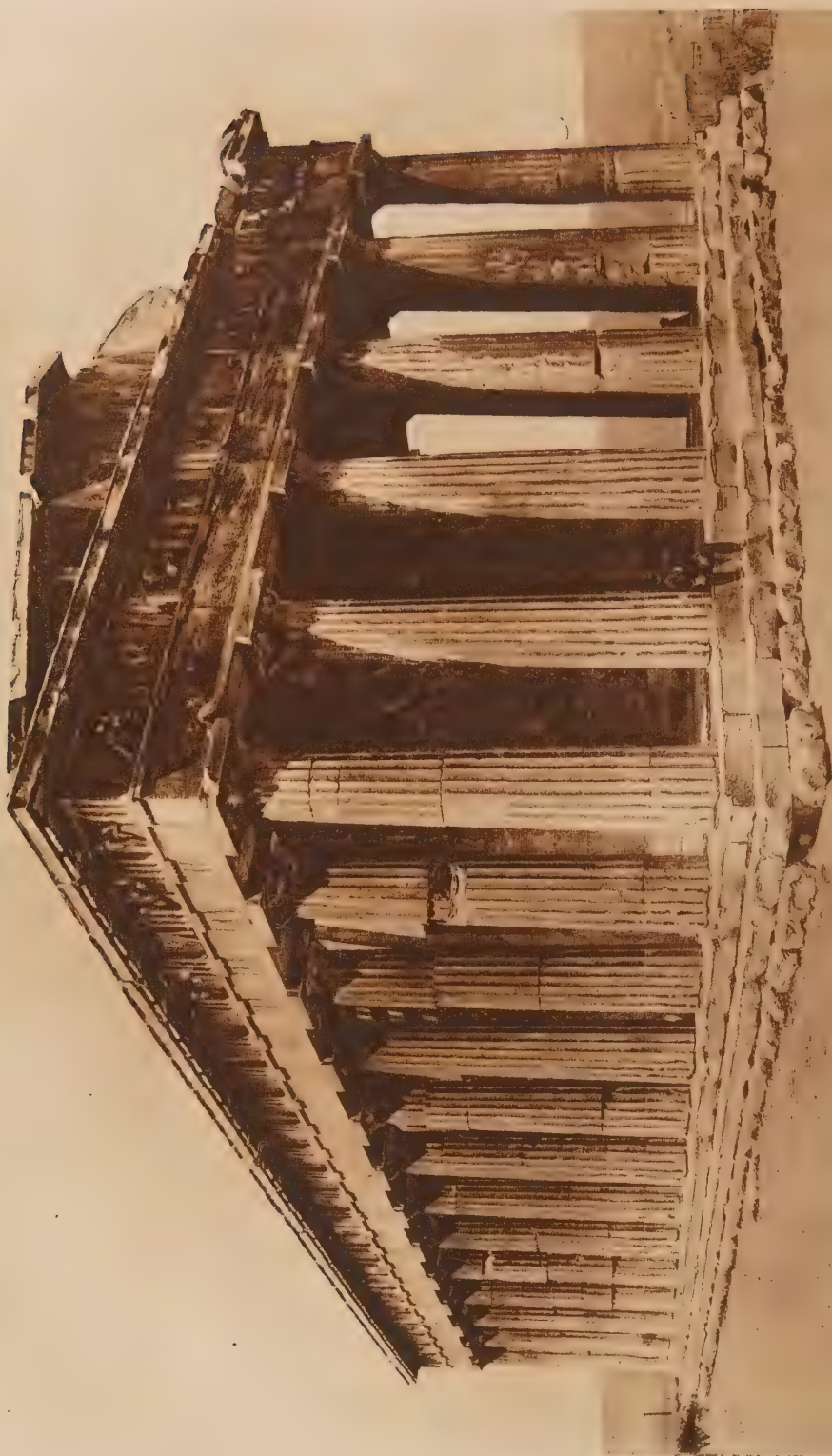
Par'thenon, a celebrated Grecian temple, built in the Age of Pericles, on the Acropolis at Athens; one of the finest monuments of ancient architecture and supposed to be the most perfect building ever erected. It is made of white marble, in the Doric style, and had originally eight columns on each of the two fronts, with seventeen columns on the sides. The length was 228 feet; breadth, 101 feet; height, to the apex of the pediments, 64 feet, and height of the columns, 34 feet. It was ornamented with large statues, and sculptures in relief, representing the chief events in the great religious festivals of the Greeks, in the life of Athena and in the history of Greece. The interior was divided into two rooms of almost equal size, in one of which was the celebrated statue of Athena, made of gold and ivory, the work of Phidias. The Parthenon was dedicated to Pallas Athena (Minerva), and was the most sacred temple of the Athenians. In the Middle Ages it served as a Christian church and as a mosque, but in 1687 it was rendered useless for any such purpose by the explosion of a quantity of gunpowder which the Turks had placed in it during the siege of Athens by the Venetians. The more precious pieces of sculpture have been dispersed among various European collections, most of them being now in the British Museum. See ELGIN MARBLES.

Parthia, *parn'the a*, in the widest sense, the Parthian Empire, lying between the Euphrates, the Oxus, the Caspian Sea and the Arabian Sea. In the narrowest sense, Parthia was the small country in Asia Minor formerly inhabited by the Parthians. The Parthians were of Scythian origin, fought only on horseback and were celebrated for their skill in archery. They were subject successively to Persians, Macedonians and Syrians, and they successfully resisted the Romans.

Part'nership, the association of two or more persons, for the purpose of undertaking and prosecuting conjointly any business, occupation or calling. Partnerships may be formed in three ways—(1) by written contract, (2) by oral agreement, (3) by implication, that is, by acts leading others reasonably to believe that a partnership exists. The duration of the partnership may be limited by the contract or agree-



THE PARTHENON, AT ATHENS



THESEUM, AT ATHENS

ment, or it may be left indefinite, subject to be dissolved by mutual consent, or by withdrawal of one member. It may also be dissolved by a court for various reasons. The members of a partnership are called *nominal* when they have not any actual interest in the trade or business, or its profits, but, by allowing their names to be used, hold themselves out to the world as apparently having an interest; *dormant*, or *silent*, when they are merely passive in the firm, in distinction to those who are active and conduct the business as principals, and who are known as *real*, or *ostensible*, partners.

A partnership may be limited to a particular transaction or branch of business, without comprehending all the adventures in which any partner may embark, but such reservation must be specified in the contract. For in the usual course each member of a partnership is liable at common law for the debts of the firm, and a silent partner is responsible for all debts of the firm which have been contracted during his partnership. The powers of partners are very extensive, and the contract or other act of any member of the partnership in matters relating to the joint concern, is, in point of law, the contract or act of the whole and consequently binding upon the whole, to the extent of rendering each liable for it individually, as well as through his interest in the partnership property. This rule holds, even though the acts of one partner are fraudulent in relation to the others. Suits at law cannot be begun for or against the firm as a firm, but must be in the name of the partners individually.

Limited partnerships are authorized by some states, in which each partner is liable for the firm's debts only to the extent of his investment. See JOINT STOCK COMPANIES.

Partridge, a name given rather loosely to a number of different birds of the grouse family. The common partridge of England is a handsome gray bird, with a dark chestnut horseshoe mark on the breast and broad reddish bars on the sides and flank. It is common almost all over



PARTRIDGE

Europe and feeds on grain and other seeds, insects and such pupae as are chiefly found in cultivated grounds. Like the quail, and unlike the true grouse, the partridges live in pairs. Their nest, which is circular and lined with grass, is placed among reeds, in hedges or in stubble, often near a road, and contains from nine to twenty eggs. In the United States the name partridge is applied to different birds in different localities. In the eastern states the ruffed grouse is called the partridge. In the southern states the quail, or "Bob White," takes the name.

Partridge, WILLIAM ORDWAY (1861-), an American sculptor, also distinguished as an art critic and lecturer. He was born in Paris, was educated at Columbia University, New York City, and later studied sculpture in Florence and Rome. His large bronze statue of Hamilton in New York City is now considered of first rank. In 1894 he completed the statue of Shakespeare which was unveiled at Lincoln Park, Chicago. Of his literary works the following are popular: *Art for America*, *The Technique of Sculpture* and *Song Life of a Sculptor*.

Partridge Berry, a pretty little trailing plant, with white or pink fragrant flowers and scarlet berries. The flowers are borne in pairs, and the fruits of the two grow together, making a single berry.

Pas'ade'na, CAL., a city in Los Angeles co., 10 mi. n. e. of Los Angeles, on the Southern Pacific, the Atchison, Topeka & Santa Fé and other railroads. The name is said by some to be of indian origin, signifying *the crown of the valley*, and by others to be from the Spanish, meaning *the threshold of Eden*. The city has a beautiful location at the head of the San Gabriel Valley, near the base of the Sierra Madre range, where the healthful climate has made it an attractive residence place and a popular winter resort. There are a number of large, fine hotels, including the Raymond, the Green, the Maryland and La Pintoresca. The city has a large public library, the Throop Polytechnic Institute and an Academy of Sciences possessing a valuable museum of archaeology and natural history. There are extensive parks and a fine new high school building. The industries include the cultivation of lemons, oranges and various other fruits, meat packing, fruit canning and manufacturing of woodwork, boots, shoes and brick. Pasadena was first settled by the Spaniards about 1771 and still contains some

Pascal

of their old houses. In 1874 a company from Indianapolis, Ind., began raising fruit there, and the city was incorporated in 1886. Population in 1910, 30,291.

Pascal, *pa skahl'*, BLAISE (1623-1662), a French philosopher and mathematician, born at Clermont, in Auvergne. In 1647 he invented a calculating machine, and about the same time he made several discoveries concerning the equilibrium of fluids and the weight of the atmosphere. Among his well-known works are *Provincial Letters*, *Thoughts on Religion and Certain Other Subjects* and *Apology of the Christian Religion*.

Pasha, *pa shah'*, in Turkey, an honorary title, originally bestowed on princes of the blood, but now conferred upon military and civil officials of high rank. There are three grades, originally distinguished by the number of horse tails waving from lances borne before them. Three horse tails were allotted to the highest dignitaries; two tails to the governors of important provinces, and one tail to minor provincial governors.

Passaic, N. J., a city in Passaic co., about 4 mi. s. e. of Paterson and 12 mi. n. w. of New York, on the Passaic River, at the head of navigation, and on the Lackawanna, the Erie and other railroads. It has a picturesque and healthful location, in the most fertile region of the state. Its city hall and other public buildings are fine structures, and it has a beautiful park. The Reid Memorial Library is one of the finest structures in the city. There are rubber and woolen mills, dye and print works, brickyards, chemical works, silk mills and other factories. In the vicinity are large vineyards, and considerable wine is manufactured. The municipal water supply comes from above the falls about four miles away. The place was settled about 1679, was incorporated as a village in 1869 and was chartered as a city in 1873. Population in 1910, 54,773.

Pas'samaquod'dy Bay, a bay opening out of the Bay of Fundy and lying between the State of Maine and New Brunswick. It is about 12 miles long and 6 miles wide and is dotted with small islands, which make a safe harbor for the town of Eastport.

Passenger Pigeon, *pij'un*, a wild bird which at one time abounded throughout the northern United States. It was about fifteen inches in length, with finely tinted plumage, small head and long wings. Its long tail was pointed in shape, the feathers growing shorter in regular

Passion Play

order toward the edges. At one time these pigeons could be seen every spring in countless thousands, flying north to their summer nesting-places; but the hunters shot the birds as they were flying over and, following them to their roosts or nesting places, killed them in such vast numbers that now the species is practically extinct. The roosts or breeding places were



PASSENGER PIGEON

sometimes many miles in length, and here the birds crowded together, hundreds having nests in a single tree. As late as 1876 the birds were quite numerous, and no more ruthless crime was ever committed against bird life than the extermination of the beautiful passenger pigeon.

Passengers. See CARRIER, COMMON.

Passion, *pash'un*, **Flower**, a large genus of plants, native mostly of the warm regions of America. They are all twining plants, often spreading over trees to a considerable length, and in many cases they are most beautiful objects, on account of their large, rich or gaily-colored flowers, which are often succeeded by orange-colored edible fruits, for which indeed they are chiefly valued in the countries where they grow wild. They received their name from the early Spanish missionaries, who believed that they saw in the beautiful flowers emblems of the crucifixion of Christ. On account of their beauty, many of the species are cultivated in hothouses or even out of doors in mild climates. About ten species are natives of the United States.

Passion Play, a kind of mystery play which originated in the Middle Ages, founded on the incidents of the Old and New Testament and on legends connected with the lives of the saints. The earliest plays were in Latin and were played by the priests, but in the fourteenth century they were first written in the dialects of the people and acted by the people in England, France, Germany and Italy, where they became very popular. Later on, the nature of the

Passover

plays changed and they fell into disfavor, because of the buffoonery and coarseness which were introduced into them. In the eighteenth century they took place only in Bavaria, and even here King Max Joseph forbade their performance, making an exception in the case of the Oberammergau Passion Play. In 1633 the inhabitants of Oberammergau, a little village in the Bavarian highlands, as an act of gratitude because they had escaped a plague which was causing much desolation, vowed that they would perform every tenth year a play representing the passion of Christ. Ever since, the play has been performed regularly every ten years and has attracted visitors from all parts of the world. There are about six hundred performers, all villagers, who play their parts with religious fervor and reverence. The part of Christ is taken by the man of their number who is the most deserving of this great honor.

Pass'over, the principal Jewish festival, instituted to commemorate the providential escape of the Hebrews in Egypt, when God, smiting the first-born of the Egyptians, *passed over* the houses of the Israelites which were marked with the blood of the paschal lamb. It was celebrated on the first full moon of the spring, from the 14th to the 21st of Nisan, the first month of the sacred year. During the eight days of the feast the Israelites were permitted to eat only unleavened bread; hence the Passover was also called the "feast of unleavened bread." On the first evening, every householder, with his family, ate a lamb killed by the priest, which was served up without breaking the bones. If the family was too small to eat the entire lamb, neighbors were called in to partake of the feast. The history of the deliverance was read by the head of the house, and psalms were sung.

Pass'port, a warrant granted by a government to its citizens who wish to travel abroad. It consists of a declaration of citizenship and permission to leave the country granting the passport. In some states no foreigner is allowed to travel without a passport from his government, and in all cases the visitor to the continent of Europe is wiser to provide himself with one, if only as a means of identification. In Russia and Turkey, in particular, a passport is indispensable. In the United States, passports are issued by the state department at Washington. They are good for two years from date, renewable by stating the date and number of the old one. The fee required is one dollar.

Pasteur

Pasteur, *pas tōr'*, LOUIS (1822-1895), a French chemist and biologist, born at Dole, Jura, educated at Jena University and at the Ecole Normale, Paris, where in 1847 he took his degree as doctor. In 1867 he became pro-



LOUIS PASTEUR

fessor of chemistry at the Sorbonne and in 1882 was chosen a member of the French Academy. He was especially successful in his efforts to check hydrophobia, by means of inoculation (See HYDROPHOBIA).

It is said that a German manufacturer of chemicals noticed that impure nitrate of lime fermented when dissolved and exposed in the sun, and that this prompted Pasteur to an investigation, the result of which was the discovery of a living germ comparable in its powers to the yeast plant. He then went on to show that other fermentations—lactic, butyric, acetic—are essentially due to organisms, and that putrefaction is also due to the same cause (See FERMENTATION; PUTREFACTION). This path of investigation enabled him to make important practical suggestions in regard to the making of vinegar and the prevention of wine disease. Pasteur next (1865) directed his inquiries to those diseases of silkworms by which the silk industry in France had been almost ruined. It is said that he had never before even seen a silkworm, though he knew the supposed disease

germs which had been demonstrated by previous investigations in the insect's blood. These he traced from egg to larva, from chrysalis to moth; and as the disease is distinctly manifest in the adults, though it may be hidden in the young, the practical conclusion was plain that unhealthy moths should be rejected and that all precautions should be taken to prevent infection. But Pasteur's work on the diseases of silkworms was too heavy for him, and in 1868 he was afflicted with paralysis. Soon, however, he was at work again, investigating beer, as he had investigated wine, and here he detected the intruders which sometimes interfere with the life of the yeast plant and spoil the brew. His researches began to come yet closer to human life, for he attacked the problem of splenic fever, the bacillus of which had been discovered by Davaine and skilfully traced from stage to stage by Koch. Of Pasteur's investigations in this connection, that by which he showed that birds were not liable to fall victims to splenic fever, because the temperature of their blood is too high for the prosperity of the germ, may serve as a characteristic illustration. After 1886 the center of his work was the Pasteur Institute in Paris.

Pas'toral Poetry, poetry which deals, in a more or less direct form, with rustic life. It has generally flourished in highly corrupt, artificial states of society. Thus it was that Theocritus, the first pastoral poet, made artistic protest against the licentiousness of Syracuse, and that Vergil wrote his *Bucolics* and *Eclogues* in the corrupt Roman court. In the sixteenth century pastoral poetry received its most notable expression in the *Arcadia* of G. Sannazaro, the *Aminta* of Tasso and the *Faithful Shepherd* of Guarini. This tendency, which was so potent in Italy, spread to England and influenced the *Shepherd's Calendar* of Spenser, the *Arcadia* of Sidney, the *Faithful Shepherdess* of Fletcher, the *As You Like It* of Shakespeare and the *Comus* of Milton. The *Gentle Shepherd* of Allan Ramsay (1725) was the last successful dramatic pastoral.

Pat'ago'nia, the name formerly applied to that extreme portion of South America which is bounded on the e. by the Atlantic, on the w. by the Pacific, on the s. by the Strait of Magellan and on the n. by the thirty-eighth parallel of south latitude. Since 1881 this large territory has been, by treaty, divided between Chile and the Argentine Republic, so that the portion west of the Andes belongs now to the former, and the portion east of the Andes to the latter. The vegetation is scanty, except in the region adjoin-

ing the Andes, and in many places there are shallow salt lakes and lagoons. There are few, if any, good seaports. The Patagonians are a tall, muscular race, with black hair, thick lips and skin of a dark brown color. They are a nomad race, divided into numerous tribes, whose chief occupations are hunting and cattle breeding. This native population, however, never numerous, is rapidly disappearing. Colonization is encouraged by the Argentine government, and there are many tracts suitable for European settlement. The country was first discovered by Magellan in 1520.

Patchouli, *pa choo'ly*, a perfume obtained from the dried leaves and branches of a plant of the mint family, found in India and China, where it is cultivated on a large scale. It is used in India to scent costly Cashmere shawls, tobacco and hair oil, and it is everywhere valued as a preservative of woolens and linens from insects.

Pat'ent, a privilege from government, conveying to the individual or individuals specified, the sole right to make, use or dispose of some new invention or discovery for a certain limited period. Before the Declaration of Independence patents were occasionally issued by the colonial governments; and the Constitution of the United States expressly vested in Congress power "to promote the progress of science and the useful arts by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries." The Congress of 1790 passed an act regulating the issue of patents for inventions, which remained practically unchanged till 1836. During this time patents were granted with little discrimination. By the law of 1836 Congress repealed former acts and established a new system which still remains in force.

Application is made to the commissioner of patents in a prescribed form, containing a petition, and an oath that the applicant believes himself to be the first inventor. This is accompanied by a minute description of the invention, with drawings or models, if conditions require and permit them. This application is investigated by a special examiner, and if found novel and useful, a patent is granted for seventeen years, except in case of a design patent, which may run for three and a half, seven or fourteen years. The fees are \$15 with the application and \$20 with the grant. The Patent Office is attached to the department of the interior. The office publishes pamphlets on *The Patent Laws and*

Laws Relating to the Registration of Trade-marks and Labels and The Rules of Practice in the United States Patent Office, which may be had on application. The number of patents issued in the United States greatly exceeds that of any other country. In 1840 the number was 449; in 1850 it was 973; in 1870 it was 12,677; in 1900 it was 22,935 and in 1912 it was 37,732. The total number issued to December 31, 1912, was 1,049,325.

Patent Office. See PATENT.

Pat'erson, N. J., the county-seat of Passaic co. and the third city of the state in population and industries, is situated on the Passaic River, 12 mi. n. of Newark and 17 mi. n. w. of New York, and on the Erie, the New York, Susquehanna & Western and the Delaware, Lackawanna & Western railroads. It is also connected with several adjoining towns by electric lines and with the Delaware River by the Morris Canal. The city is built upon a broad plain and the surrounding hills, on a curve in the river, and covers an area of about 8½ square miles. The streets are broad, well graded and well paved. The river at this point has a perpendicular fall of 50 feet, and within a short distance below the falls, a descent of 20 feet, affording exceptional water power. The gorge in the river is spanned by a number of bridges. There is a park along each side of the falls, and on a hill near by is a fine soldiers' monument. The important buildings include the city hall, the courthouse, the postoffice and a number of business blocks. Among the charitable institutions are the Paterson General Hospital, Saint Joseph's Hospital, Old Ladies' Home and Children's Nursery. The city is the leading silk-manufacturing city of the United States. Other important industries include the manufacture of locomotives, steel trusses and bridge work iron and steel products, brass, machinery, cotton goods, thread, paper, jute and malt liquors.

The city was founded in 1791 by an organization of which Alexander Hamilton was one of the leaders. It was incorporated as a city in 1851. Its growth has been steady and permanent. Population in 1910, 125,600.

Paterson, WILLIAM (1658-1719), a British financier, born in Dumfriesshire, Scotland. He went through England as a peddler, settled for a time at Bristol and later lived in the Bahama Islands. Returning to London, he engaged in trade with success, and in 1694 he proposed and founded the Bank of England, of which he was one of the first directors.

Paterson, WILLIAM (1745-1806), an American statesman and jurist, probably born at sea. He came to America at an early age, graduated at Princeton (then the College of New Jersey), and was admitted to the bar in 1769. He was a delegate to the Continental Congress in 1780, and as a member of the Federal constitutional convention he offered the famous New Jersey, or "Small State," plan to the convention, providing for a single legislative house, in which each state should have one vote, an executive council, subject to removal by Congress, and a Supreme Court, elected by Congress. He served in the United States Senate, was governor of New Jersey, and from 1793 until his death was associate justice of the United States Supreme Court.

Pathology, *path ol'o jy*. See MEDICINE.

Patience, *pa'shens*. See SOLITAIRE.

Pat'more, COVENTRY KEARSEY DIGHTON (1823-1896), an English poet. His first publications were a volume of poems and a number of critical articles in great reviews of his day. His verse includes *The Angel in the House*, *The Unknown Eros and Other Odes and Poems*. While often melodious and in passages beautiful, his poems are for the most part trivial, and it is somewhat difficult to understand the high rank which was given him by his contemporaries.

Pat'mos, an island off the coast of Asia Minor, 20 mi. s. of Samos. It is a part of Turkey. Its length is about 10 miles, its breadth, nearly 6. The island is an irregular mass of barren rock; agricultural products are scanty, and the inhabitants find their chief occupation in fishing. The island is famous as the supposed place to which Saint John was exiled. Population, about 4000.

Pat'na, a city of British India, in the district of Bengal, on the Ganges, 285 mi. n. w. of Calcutta. It extends for 9 miles along the river, and its tombs, mosques and monuments present a fine appearance when seen from the river. Its streets, however, are narrow and dirty, and its buildings are of little interest. At the western side of the city is the suburb of Bankipur, where the government offices and European residences are situated. By reason of its central position and natural advantages, the city is an important business center, and it is the chief seat of the opium trade. Population in 1911, 136,153.

Pat'on, JOSEPH NOEL, Sir (1821-1901), a Scottish historical painter, born at Dunfermline. He exhibited his first picture, *Ruth Gleaning*, at Edinburgh in 1844. He produced many pictures, among which are *The Pursuit of Pleasure*, *Home* (a soldier's return from the Crimea), *In*

Memoriam (a scene from the relief of Lucknow), *Faith and Reason*, *Light in Darkness* and *The Man with the Muck Rake*. He also published two volumes of verse and was a sculptor of some ability.

Patrae, *pah'tre*. See PATRAS.

Patras, *pah'tras*, or **Patrae**, a seaport of Greece, situated on the Gulf of Patras, 13 mi. s. w. of Lepanto. The town is well built and has wide streets and numerous arcades. It contains an old citadel and the remains of a Roman aqueduct, and has modern fortifications. It is a commercial center and exports large quantities of currants, also wine, oil and skins. During the Middle Ages it was the chief commercial center of Greece. Population in 1907, 37,724.

Patriarchs, *pa'tre ahrks*, a name given to the heads of families living before the Flood and to the three fathers of the Hebrew race, Abraham, Isaac and Jacob. The term is also applied to the twelve sons of Jacob, and at a later period it became the title of the presidents of the sanhedrin, which exercised a general authority over the Jews of Syria and Persia after the destruction of Jerusalem. From them the title was adopted by the Christians, who applied it, from the beginning of the fifth century, to the bishops of Rome, Constantinople, Alexandria, Antioch and Jerusalem. The patriarch of Rome became the supreme pontiff of the West, the four heads of the Eastern Church preserving the title of patriarch. The patriarch of Constantinople is the primate of the Greek Church in the Ottoman Empire.

Pat'rick, SAINT (396-469), the apostle of Ireland, born in the British-Roman province of Valentia, probably at Nemthur on the Clyde, where Dumbarton now is. After being consecrated a bishop and receiving the papal benediction from Celestine I, he went over to Ireland about the year 432. Here he is said to have founded over three hundred sixty churches, baptized with his own hand more than twelve thousand persons and ordained a great number of priests. "He found no Christians and left no heathen." Among the many marvelous legends which have clung to his name is that which declares that he drove the snakes from Ireland.

Pa'trons of Husbandry. See GRANGE.

Patroon' System, the plan adopted by the Dutch West India Company for the colonization of New Netherlands, by which any member of the company could gain possession of a tract of land 16 miles along any river and of indefinite depth, by planting a colony of 50

persons in the province. The proprietor also had absolute power over the colony which he established, and he was known as the *patroon*. The evil effect of this system was soon apparent, and it was gradually changed, so as to remove some of its most objectionable features, but many of the estates thus created endured well into the nineteenth century. See VAN RENSSELAER, STEPHEN.

Pat'terson, ELIZABETH (1785-1879), the wife of Jerome Bonaparte. Napoleon excluded Jerome from his dynasty, and threatened him with imprisonment unless he consented to repudiate his wife. In 1805 Jerome and his wife embarked for Europe, where she was not permitted to land. Madame Bonaparte sought refuge in England, where her son, Jerome Napoleon Bonaparte, was born. Later she returned to Baltimore, and Napoleon induced the Council of State to declare the marriage void. In 1815 Madame Bonaparte herself procured a divorce. She left a fortune of \$1,500,000 to her grandsons, Jerome Napoleon Bonaparte, now in the French army, and Charles Joseph Bonaparte, who was secretary of the navy during Roosevelt's second term.

Patti, *pat'ee*, ADELINA MARIA CLOREDA (1843-), a soprano vocalist, born at Madrid.



ADELINA PATTI

She received her musical training from her brother-in-law, Maurice Strakosch, made her first appearance in New York in 1859 as Lucia

Pattison

and in 1861 made a brilliant début at Covent Garden, London, in several famous rôles. Afterward she fully established her reputation as an artiste in the chief cities of America and Europe. In 1868 she married the marquis de Caux, from whom in 1883 she obtained a divorce. Subsequently she married Signor Nicolini, after whose death she was married to Baron Cederström.

Pat'tison, ROBERT EMORY (1850-1904), an American politician, born in Somerset County, Md. He was taken in infancy to Philadelphia, where he received an elementary education and was admitted to the bar in 1872. Though a Democrat in a strongly Republican city, he was elected comptroller in 1877 and was reelected in spite of tremendous opposition. In 1882 he was nominated for governor and elected, being the first Democrat to hold that office in Pennsylvania in thirty years. He was again elected governor in 1890, and during both terms he served the state with ability and energy.

Pau, *po*, a town of France, capital of the Department of Basses-Pyrénées, picturesquely situated on a height above the right bank of the Gave de Pau, in view of the Pyrenees. The most interesting building of the city is the castle of Henry IV, which has recently been restored. Pau is a favorite winter resort, as it has a mild, dry climate, with a peculiarly still atmosphere and no sudden variations in temperature. The manufactures comprise linens, cutlery, chocolate and wine. Population in 1911, 37,149.

Paul, the apostle, commonly called Saint Paul, was born of Jewish parents at Tarsus, in Cilicia. He went to Jerusalem to study under Gamaliel, one of the most celebrated Jewish rabbis. Thus prepared for the office of teacher, he joined the sect of the Pharisees and became a persecutor of the Christians. He was present at and encouraged the stoning of Stephen, and it was only when he was overtaken by a vision on his way to Damascus that he became a convert to Christianity. Arabia, Syria, Asia Minor, Greece and the islands of the Mediterranean were the scenes of his labors. The churches of Philippi in Macedonia, of Corinth, Galatia and Thessalonica honored him as their founder; and he wrote epistles to these churches and to the churches in the chief cities of Greece and Asia Minor. He went to Jerusalem and was there arrested and brought to Caesarea, where he was kept a prisoner for two years by the Roman governors Festus and Felix. He appealed, as a Roman citizen, to the emperor; and on his way to Rome, where he arrived in the

Paulists

year 62, he was shipwrecked on the island of Melita. According to the tradition of the early Church, he suffered martyrdom during the reign of Nero.

Paul, the name of five popes. **PAUL I**, pope 757-767, brother of Stephen II, was on good terms with Pippin and Charlemagne. **PAUL II**, pope 1464-1471, caused a crusade to be preached against the Hussites. **PAUL III**, pope 1534-1549, formerly Alessandro Farnese, was a zealous defender of the Church and did much to suppress heresy. Among the important events of his reign were the publication of a brief condemning slavery, the excommunication of Henry VIII of England, the approval of the Order of Jesuits and the convocation of the Council of Trent. He was a great patron of art and appointed Michelangelo architect in chief of the Vatican and Saint Peter's. **PAUL IV**, pope 1555-1559, joined France in the war for the conquest of Naples (1555-1557). **PAUL V**, pope 1605-1621, laid an interdict on Venice and established the Congregation of the Oratory and of the Ursuline and Visitation.

Paul I (1754-1801), emperor of Russia, son of Peter III and Catharine the Great. On the death of Catharine, in 1796, he succeeded to the throne. He put an end to the war with Persia and liberated the Poles who were in confinement in Russia. He joined the coalition against France, but afterward favored the cause of Napoleon and laid an embargo on all British ships in the Russian ports. He was put to death by conspirators.

Paul'ding, JAMES KIRKE (1779-1860), an American miscellaneous writer, born in Pleasant Valley, N. Y. He removed to New York, where he became intimately acquainted with Washington Irving and published, with him, a series of humorous and satirical essays, entitled *Salmagundi*. For some years he was secretary of the United States navy. He published several novels, among which are *Koningsmarke* and *The Dutchman's Fireside*; a *Life of Washington*, many political pamphlets and some poems.

Paul'ists, the common name of a priestly order, organized for the purpose of doing missionary work in the United States. The correct designation of the order, which was founded in 1858, is The Congregation of Missionary Priests of Saint Paul the Apostle. They have a magnificent church in New York City, which is also the central home of the order. A large proportion of its members are converts from Protestantism, and they make a special effort

to spread their faith among the non-Catholic citizens of the United States. *The Catholic World* is their monthly publication.

Pauncefote, *pawns'fut*, JULIAN, Lord (1828-1902), an English statesman and diplomat, born at Munich, Germany, educated at Paris and Geneva. He was admitted to the bar in 1852. In 1866 he was appointed attorney-general at Hong Kong and acted as judge of the supreme court in 1869 and again in 1872. He was knighted in 1874, and two years later he became undersecretary of foreign affairs. In 1888 he was appointed as British minister at Washington, and in 1893 he was raised to the rank of ambassador. His greatest diplomatic success was the completion, with Secretary Hay, of the treaty relating to the construction of a trans-isthmian canal. He always used his influence to promote a friendly feeling between the United States and Great Britain. See HAY, JOHN; HAY-PAUNCEFOTE TREATY.

Pauperism, *paw'pur iz'm*, the condition of persons who are dependent upon public aid for support. This problem has been treated differently by different countries and at different times. The problem was not presented to the nations of antiquity, since extreme poverty was comparatively rare among them. During the Middle Ages pauperism was attended to chiefly by the Church, which taught that alms-giving and charity were essential to the obtaining of grace. At the beginning of the modern period, the State began to assume the control of relief for the poor, first through the cities and later through the general government. To-day, in Catholic countries, pauperism is generally relieved through Church agencies, but the State supports certain charitable institutions, such as hospitals and homes. In Germany there is a combination of public and private charity, administered by trained inspectors, who investigate cases individually and thoroughly. In Italy, there is little control of pauperism beyond that exercised by the Church. In England, State aid to the poor has been carried to extreme conclusions. Taxes are levied for the purpose, and the proceeds are administered by local boards, which are responsible to the general local government board of England. Workhouses, special schools, hospitals and other philanthropic institutions are supported by this means. In the United States, poor relief is recognized as a public duty, but it is usually cared for by the smaller, or local, units of government; in the large cities, by municipal governments, and elsewhere, by the county

governments. There has been a rapid growth in the number of institutions for the care of pauper invalids and criminals.

Pavement, a floor or covering of stone, wood, brick or asphalt, laid on the ground so as to make a hard, smooth surface, fit for a roadway. Pavements were in use in ancient times, though their origin is obscure. The streets of Babylon are said to have been paved in 2000 B. C. According to Livy, Rome was paved as early as 170 B. C. and pavements of lava have been found in the excavations of the old Roman cities of Pompeii and Herculaneum. In the Middle Ages pavements were not common until the twelfth century, and from that time to the nineteenth century they were rudely constructed, large cobblestones being generally used. Of modern cities, Paris is said to have been the first paved; now at least a part of the streets in all cities of Europe and America have pavements.

Stone pavement is the most durable, and this is used for the business streets of large cities. Granite, which is the most suitable stone, is made into rectangular blocks, which are laid on the narrow side, on a foundation of concrete, and are set close together in rows, across the street. Such pavements are very expensive and are used only in the streets where a great amount of heavy traffic is done.

Brick pavement is of bricks made especially for the purpose, being so hard-burned that they have a glassy appearance. They are laid on a foundation of sand, gravel or tarred planks, in a manner similar to that of the granite blocks in a stone pavement. This pavement is used extensively in the Western United States.

Wooden pavement is made of cylindrical blocks about six inches long, laid so that the ends of the blocks form the surface. The foundation of boards is covered with hot coal tar; the blocks are then set on end in contact, the spaces between being filled with sand or gravel, and the surface covered with a coating of hot tar. This pavement is now little used, because it wears unevenly and decays rapidly.

Asphalt pavement is made by spreading a coating of sand and asphalt two or three inches deep on a solid foundation, then rolling it with a heavy roller. These pavements are very durable, the wear compacting the material instead of grinding it away. It is noiseless; is easily cleaned and has been used extensively in the United States, especially in the residence streets, where heavy traffic is uncommon.

Pavia, *pah ve'a*, a city of Italy, capital of the Province of Pavia, on the left bank of the Ticino, 19 mi. s. of Milan. It is still partly surrounded by old walls and fortifications. Among the principal buildings are the cathedral, begun in the fifteenth century and never finished; the Church of San Michele, the castle now used as barracks, and the university, which is one of the oldest in Europe and was during the Middle Ages one of the most famous. The manufactures of the town are unimportant, and the trade consists largely in silk, olives, wine and Parmesan cheese. Pavia was a place of considerable importance under the early Roman emperors. It afterward came into the possession of the Lombard kings, who made it their capital, and later it was under the Milanese. Population in 1911, 39,898.

Pawn/brokers, persons who lend money on the security of goods *pledged* or deposited with them. Although this mode of borrowing is occasionally taken advantage of by all classes, and bankers, when they accept security for their advances, act on the same principle as the pawnbroker, the business, as a special one, originates chiefly in the necessities of the poor, who, by depositing an article of personal property, can secure the use of a small sum of money for a short period at a comparatively high rate of interest. On the European continent this form of borrowing is partly conducted by charitable institutions called *Monts de Piété*. The business is regulated by statutes in most of the states.

Pawnee', once a large tribe of indians living in what is now Nebraska and Kansas, whence they often went south and west on expeditions across the plains. They were a strong, hardy race, always at war with their neighbors, and early became skilled horsemen. The remnants of the tribe are now scattered upon reservations in Oklahoma.

Pawpaw'. See PAPAWE.

Pawtuck'et, R. I., a city in Providence co., 4 mi. n. of the business center of Providence, on the Blackstone River, at the head of navigation, and on the New York, New Haven & Hartford and several electric railroads. In 1790 Samuel Slater first introduced into the United States at Pawtucket the manufacture of cotton goods, which is today the leading industry. Woolen and silk goods, leather, machinery, thread, twine, rope, spools, gymnasium supplies, electrical goods, nuts, bolts and paper are manufactured on a large scale. Calico printing is also important.

The thread works are the largest in the country. Bleaching and dyeing are among the leading industries. The city has many beautiful residences and five parks, the largest of which is Slater Park. Other interesting features are Collyer Monument, a soldiers' monument and several bridges. Some of the prominent buildings are the Sayles Memorial Library, a home for the aged poor, Emergency Hospital and a state armory. The place was settled about 1654. The town was incorporated as a city in 1885 and the new city government was organized in 1886. Population in 1910, 51,622.

Pax'ton, JOSEPH, Sir (1801-1865), a landscape gardener and architect, born in Bedfordshire. He became gardener and latterly was estate manager to the duke of Devonshire, at Chatsworth, in Derbyshire. His design of the Crystal Palace for the great International Exhibition, London, in 1851, gained him great popularity, and soon after he was knighted. He was elected member of Parliament for Coventry in 1854 and continued to represent it until his death.

Payne, JOHN HOWARD (1791-1852), an American actor and dramatist, best known for



JOHN HOWARD PAYNE

his song, *Home, Sweet Home*. He was born in New York, where, at thirteen, while a merchant's clerk, he proved his remarkable precocity by editing the weekly *Thespian Mirror*. His father's

bankruptcy forced him to leave Union College after two years' attendance, and in 1809 he began to support the family by acting. He won great applause in the chief American cities and in London, where he supported himself until 1832 by adapting foreign plays and writing original ones. His lack of business ability kept him always poor. He served as consul at Tunis, Africa, from 1842 to 1845 and again from 1851 until his death. In 1883 his body was removed to Washington, D.C. His famous song, with music adapted from an old Italian melody, was first sung in his opera, *Clari*, at London in 1823.

Payne, SERENO ELISHA (1843-1914), an American politician, born at Hamilton, N. Y., educated at the University of Rochester and admitted to the bar in 1866. He began the practice of law in Auburn in the same year, was elected district attorney of Cayuga County in 1873, was chosen to Congress in 1883, was re-elected two years later and continuously from 1889 to 1909. During his later terms he was acknowledged leader of the Republican majority in the House of Representatives.

Pea, *pee*, a genus of plants belonging to the leguminosae, or pulse family, and usually characterized by long, slender stems, smooth leaves and a fruit consisting of round seeds enclosed in a pod. There are many varieties of pea, ranging from the short dwarf pea that grows but a few inches high, to those whose vines are of such length that they cover poles from eight to ten feet in height. Peas are extensively raised in all the cooler regions of the northern hemisphere, since they form valuable food for man and domestic animals. For feeding stock they are usually allowed to ripen, then are dried and ground, either with other grains or alone. For table purposes in the United States, they are used green more extensively than in any other way, and in the northern part of Wisconsin and some other localities, the raising and canning of green peas is an important industry.

Peabody, MASS., a town in Essex co., 2 mi. w. of Salem, on the Boston & Maine railroad. It has the Peabody Institute, with a large library, established by George Peabody, and the Sutton Reference Library. The county agricultural society has its headquarters here, and Emerson Park is of interest. There are extensive manufactures of leather, morocco, shoes, gloves, machinery, thermometers, electrical supplies, hardware and other articles. It was a part of Salem and later of Danvers, and it became a separate town in 1855. The present name was

adopted in honor of George Peabody in 1868. Population in 1910, including several villages, 15,721.

Peabody, GEORGE (1795-1869), an American merchant and philanthropist, born at Danvers, Mass. (now Peabody). At the age of seventeen, he went to Georgetown, D. C., where he engaged in the dry goods business. He served for a time in the War of 1812 and removed to Baltimore in 1815, where his business expanded to such an extent that branches were established in New York and Philadelphia. Later he founded the firm of George Peabody & Company in London and lived there until his death, always maintaining, however, an active interest in the United States. He made many gifts for philanthropic and educational purposes, of which the most important were \$200,000 to found the Peabody Institute and Library in his native town, \$150,000 each to Yale and Harvard, \$140,000 to the Peabody Academy of Sciences at Salem, Mass., \$10,000 to assist the United States Sanitary Commission during the Civil War, \$1,250,000 to found the Peabody Institute, Library, Art Gallery and Conservatory at Baltimore, \$2,500,000 for the construction of lodging houses in London and \$3,000,000 to form a Peabody Educational Fund to promote the education of both white and negro students in the Southern states (see **PEABODY EDUCATIONAL FUND**).

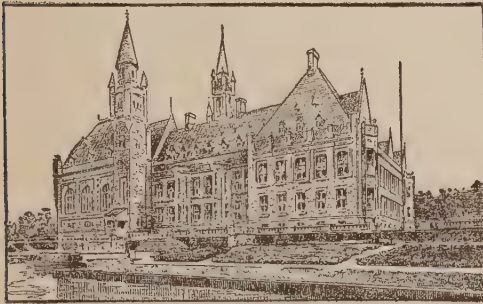
Peabody Educational Fund, a fund bequeathed in 1867 and 1869 by George Peabody for the purpose of aiding education in the South. The fund consisted of securities amounting to \$3,100,000, but \$1,384,000 of this was in bonds of some of the Southern states, which, because of the Civil War, were repudiated. The fund is under the management of a board of trustees, who select an agent as their executive officer. It is the duty of this agent to recommend the use to which the income from the funds should be put. According to the provisions of the donor, after the first two years the principal was to remain without division for thirty years, at the expiration of which time it could be used in such way as the trustees should decide. Nearly all of the income from the fund has been applied to aiding schools established for the training of teachers. According to the regulations of the trustees, a school having 100 pupils and complying with their requirements may receive \$300. If it has 200 pupils it may receive \$600, and if it has 300 pupils, \$1000. Many scholarships, varying in value from \$100 to \$200, have been granted to worthy students. At the close of the

Peace Conference

thirty years, about \$2,600,000 had been paid out, and the fund was in excellent condition. Most of the money has been expended in the Southern states and applied to the education of both white and colored students. See SLATER FUND.

Peace Conference, INTERNATIONAL, a congress of delegates of the chief nations of the world, assembled at The Hague, Holland, on May 18, 1899, at the request of Czar Nicholas II of Russia. On Aug. 24, 1898, he caused a note to be sent to the foreign diplomats at Saint Petersburg, pointing out the necessity of a general convention for discussing the maintenance of peace throughout the world and the general disarmament of nations.

Steps were at once taken by the various governments to appoint representatives to the conference, which met, by the invitation of Queen Wilhelmina of The Netherlands, at The Hague. When it assembled, May 18, 1899, the nations represented were the six great European powers and eight smaller European states, four Asiatic



PERMANENT PEACE PALACE AT THE HAGUE

governments, China, Japan, Persia and Siam, and the United States and Mexico. The conference immediately appointed committees and sub-committees, who went into secret session to receive various propositions upon the particular line of work each was to consider. The general conference met every few days to hear and discuss the reports of these committees. On the 29th of July the congress was brought to a close.

In regard to disarmament the delegates contented themselves with a declaration of the desirability of an arrest in the increase of the armaments. They also signed resolutions referring the question of the rights of neutrals and private property and of bombardment to a future conference and urging a reduction in the military and naval budgets. The rest of their work consisted of three declarations, against (1) the use of balloons for dropping explosives; (2) the

Peach

use of shells which give forth deadly gases; (3) the use of bullets which expand when they strike the human body. The American and English delegates declined to sign the second and third clauses of this agreement. The powers, besides, signed three "conventions," one of which applied the humane provisions of the Geneva Convention to naval warfare (See GENEVA CONVENTION). Another embodies a perfected code of the rules of war (See INTERNATIONAL LAW).

This last, the great achievement of the conference, makes mediation an international duty and provides for the establishment of a permanent court of arbitration with a bureau at The Hague. It also makes it the duty of all governments to encourage the submission of disputes to the court and provides for the elaboration of a complete code of arbitration procedure. This convention was in the form of a treaty and was ratified by the United States Senate Feb. 5, 1900. The permanent court is to consist of four representatives of each of the powers, though the same person may represent more than one power. The term of service is six years, and a member may be reappointed. Unless the parties agree differently, arbitrators for a dispute are to be chosen from this board, two by each party, these to choose a fifth, known as the umpire.

At a second conference, held in 1907, forty-five nations were represented. This conference adopted thirteen conventions which tend to strengthen the work of international arbitration.

Peach, a fruit closely allied to the plum and cherry. The peach is one of the most delicious fruits of temperate climates. It is cultivated more extensively in the United States than in any other country. Its range is from the Gulf of Mexico to southern New England and the shores of Lake Ontario and Lake Michigan.

The tree is small, rarely exceeding twenty-five feet in height, and has small, willow-shaped leaves. The blossoms appear in early spring, before the leaves, and are a light pink or a pale blue. The fruit has a fuzzy skin and contains a rough, hard pit or stone. When ripe the fruit becomes a soft, fleshy drupe. There are many varieties of peach under cultivation, but all are grouped under two classes, *freestones* and *clingstones*. In the former the fleshy part of the fruit when ripe separates from the pit or stone, while in the latter it does not. The peach thrives best in a warm temperate climate, with numerous sunny days, and it prefers a light, sandy soil.

Peacock

The growing trees are usually set in rows about twenty feet apart. The fruit is picked a little before it is ripe. It is usually packed in small baskets and is common in all American markets from August to October. It is eaten raw, preserved, dried and canned. Next to the apple, the peach is the most important American orchard fruit. The leading states in its production are Michigan, Georgia, Texas, California, New York, Delaware, New Jersey and Illinois. California produces the largest quantity, and Michigan ranks second.

Pea'cock, the male of the pea fowl, a large pheasant, of which only two species are known.



PEACOCK

The male is remarkable chiefly because of his brilliant plumage and the enormously long feathers that cover his tail and form a beautiful train, which may be erected and spread out into a gorgeous fan. The feathers of the peacock have been so long used for ornament that they are well known to every one, and history shows that the bird was kept by the Hebrews and early Greeks, among whom and the Romans it was used in banquets as a table fowl. It will live in almost any climate with a little care, but the young are delicate and hard to rear, so that the numbers do not increase rapidly. The female is much smaller, has no train and is dull of plumage. The *Javanese peacock* is the second species and almost equals in beauty the one described.

Peanut

Peale, CHARLES WILSON (1741-1827), an American painter and writer, born at Chesterton, Md. He studied under Copley in Boston and also under Benjamin West in London. He returned to America in 1774 and soon settled in Philadelphia. He is best known by his portraits of famous Revolutionary soldiers and statesmen. Among them are fourteen portraits of Washington, one of which, ordered by Lafayette, now hangs in the National Institute at Paris. He also painted notable portraits of Benjamin Lincoln, Nathaniel Greene, Count de Rochambeau, Horatio Gates, Baron de Kalb and several later statesmen. Many of his portraits now hang in Independence Hall, Philadelphia. Before his death he painted *Christ Healing the Sick*, which is one of his few works upon subjects other than portraits.

Peale, REMBRANDT (1778-1860), an American artist, born in Bucks co., Pa. When seventeen years old he executed a portrait of Washington, which was purchased by Congress in 1823, and other portraits of eminent men. He was president of the American Academy and one of the original members of the Academy of Design. Among his well-known pictures are *The Roman Daughter*, *The Court of Death* and *The Ascent of Elijah*.

Pea'nut or **Goo'ber**, the fruit of a small



PEANUT

vine of the pea family. When the flower falls, the stalk supporting the undeveloped pod

Pear

lengthens and, bending downward, pushes the fruit into the ground, where it grows and ripens. The peanut is cultivated in most of the Southern states and in the Eastern states as far north as southern Indiana. It is sometimes known as the *groundnut*. In the United States the annual crop amounts to more than 12,000,000 bushels, the greater part of which comes from Florida, Georgia, North Carolina and Virginia. Peanuts are roasted and eaten as a delicacy, and they form the basis of many of the modern health foods. An oil used in making salads and as an ingredient of soaps is expressed from the seeds.

Pear, pair, a fruit closely related to the apple. It grows wild in many parts of Europe and Asia, and from the wild pear the numerous cultivated varieties have originated. The tree in its general appearance closely resembles the apple tree, but does not grow as large. The fruit in its structure resembles the apple, but in shape it is irregularly conical, with the base of the cone hanging downward. When ripe, the pulp is soft, sweetish and pleasing in flavor. In certain varieties, however, the fruit is hard and crisp. The pear is propagated by grafting (See GRAFTING). The scions are usually grafted to wild pear stock, but they may be grafted to the quince and the white thorn. This fruit is extensively cultivated in France, in the northern part of Italy and in the United States in California, New York, Michigan, Oregon and Washington. The choicest fruit is obtained from California and Oregon. The fruit is picked while green and is allowed to ripen slowly; otherwise, it decays before fully ripe. Pears are used as they come from the trees and are also canned and dried.

Pea Ridge, BATTLE OF, a battle of the Civil War, fought at Pea Ridge, Arkansas, March 7 and 8, 1862, between a force of 10,500 Federals, under General S. R. Curtis, and a Confederate force of about 14,000, under Price, McCulloch, Van Dorn and Pike. Curtis advanced against Price, who was at Springfield, Mo., and Price retired, being joined by the other Confederate forces. They then attempted to strike the Federal army in the rear and compel its surrender. The attack was at first successful, but it finally resulted in a fearful slaughter without important gains, and Van Dorn, who was in chief command, ordered a retreat. The Federal loss was about 1400; that of the Confederates, probably more than 1000. The battle resulted in saving Missouri to the Union cause.

Pearl

Pearl, purl, a small, roundish body, found in the shells of certain mollusks, such as oysters. Pearls are secreted by the mantle of the animal. They are caused by the presence of some irritating body, as a grain of sand. The pearl is formed by a secretion which hardens over the sand and makes it less irritating, and if this projection breaks loose and becomes rounded or pear-shaped, it is valued as a pearl for jewelry. Pearls are not found in all oysters, and perfect ones are of rare occurrence. In color they are white, black or pink, and they reflect the light in a beautiful play of colors.

The most valuable pearls come from the large oyster found most abundantly in the Persian Gulf and off the west coast of Mexico. In the Persian Gulf the fishing is done from a boat, which is accompanied by five pairs of native divers. One goes to the bottom, pulled down by a heavy weight which he carries. His partner watches from the boat the cord attached to the diver; at the proper signal the man in the boat draws up the weight, then the oysters and lastly the diver. The oysters are carried to the shore and laid in piles, where they remain until they become thoroughly decomposed; then they are thrown into sea water and carefully examined for pearls, while the shells are cleaned and split into layers for the mother-of-pearl which they contain.

The pearl fisheries of Ceylon are a government monopoly, but the revenue derived from them is not a regular one, the fishery sometimes failing for years in succession. There was no fishery, for example, between 1837 and 1854 or between 1863 and 1874. The pearl oyster occurs throughout the Pacific. Very fine pearls are obtained from the Sulu Archipelago, north-east of Borneo. Of late years pearl fishing has been started with considerable success in Australian seas; and it is carried on also in the Gulf of Mexico, upon the coast of California and in the vicinity of Panama.

Pearls have formed valued articles of decoration and ornament from the earliest times. Julius Caesar presented Servilia, the mother of Marcus Brutus, with a pearl valued in modern computation at \$240,000, while Cleopatra was said to have swallowed one gem valued at \$300,000 or \$400,000. The "Pilgrim" pearl of Moscow is diaphanous in character and weighs 24 carats.

Artificial pearls are largely made in France, Germany and Italy. They are very well imitated by the scales of certain fishes. A substi-

tute for black pearls is found in close-grained hematite, not too highly polished, and pink pearls are imitated by turning small spheres out of the rosy part of the conch shell.

Peary, *pee ry*, ROBERT EDWIN (1856-), an American naval officer and Arctic explorer, born at Cresson, Pa., and educated at Bowdoin College. In 1881 he became a civil engineer in the United States navy and was given the rank of commander. Since 1888 Commander Peary has spent most of his time in the Arctic regions. The most noted results of his expeditions are the following: determining that Greenland is an island; the discovery of Melville Land and Heilprin Land beyond Greenland; the rounding of the Greenland Archipelago, the last great land group to be explored. His crowning achievement was reaching the North Pole on April 21,



ROBERT E. PEARY

1909. Peary is recognized as the foremost Arctic explorer of his time. His scientific achievements have been as important as his discoveries of unknown regions. He has been awarded several medals by American and foreign geographical societies and has been made an honorary member of the leading scientific associations in all parts of the world. See NORTH POLAR EXPLORATION.

Peasants', *pez'ants*, **War**, a great insurrectionary movement among the peasantry, which in 1525 spread over the whole of Germany. The immediate cause of this movement was religious

fanaticism, but the forces by which it was impelled grew out of the long course of oppression to which feudal customs had subjected the people. The peasants had thought that Luther would aid them in their rising, but he was determined to keep the religious movement free from political complications, and worked rather against, than for, the peasants. The rising was put down, and almost one hundred thousand peasants were put to death as a punishment.

Peat, *peat*, a sort of turf extensively used in some regions as a fuel. It is composed principally of dead mosses, but it often contains small twigs and even tree trunks that have fallen and have been kept from rotting. The mosses began to grow many centuries ago and continued branching and intermingling till they formed close woven mats, which killed the lower parts of the stems. As the moss died below, it continued to grow above. These mosses thrive only in wet places; hence in the course of centuries the areas known as *peat bogs* have been formed. When thoroughly dried, peat burns with considerable heat and but little smoke. For centuries it has been extensively used for fuel in Ireland and Scotland, where it is found in large quantities. The simplest method of preparing it for fuel is to dig the peat from the bog and cut it into brick-shaped blocks, which are set up to dry. In some localities the peat is ground and purified from the earth and clay by washing. The prepared peat is then run into beds about four inches deep and allowed to dry partially, when it is cut into blocks about four inches square and twelve inches long. These are then stacked and allowed to become thoroughly dry. See COAL; FUEL.

Pecan', a species of hickory, growing in North America and cultivated especially in California and in the Southern states, for the nut. The nut is oblong and has a thin shell. The variety called the *paper shell pecan* has a very thin shell and is the most desirable. The tree is large, with hard, very tough wood and with catkins of small flowers. Texas and Louisiana produce most of the pecans of commerce. See HICKORY.

Pec'cary, a genus of animals, nearly allied to the swine. One species, the *collared peccary*, about three feet long, occurs abundantly in South America and also in North America, living generally in small flocks. Their food consists of mace, potatoes, sugar cane and similar materials, and cultivated fields suffer much from their raids. The other species, called *white-*

hipped, is larger and is found only in South America. The flesh is savory and is coarser and stronger than pork.

Pecos, pa'kos, River, a river of New Mexico and Texas, which rises in the Rocky Mountains in San Miguel co., N. M., runs in a southeasterly direction and, after a total course of about 800 miles, flows into the Rio Grande. During the hottest weather it is almost dry.

Pedagogics, *ped a goj'iks*, or **Pedagogy**, *ped'a go jy*, the science and art of teaching. The term is derived from *pedagogue*, which comes from a Greek word meaning a *leader of children*. The Greek *pedagogue* was a slave who acted as the attendant and protector of a child. Later the Romans applied the term to the slave who taught the child Greek. From this the significance of the term was transferred to one who teaches. *Pedagogics* has a narrower application than education; the term applies only to the principles and theories of education, whereas *education* pertains not only to the application of these principles and theories, but also to the establishing of whatever measures and systems may be necessary for this purpose. "Pedagogy, so to speak, is the theory of education, and education the practice of pedagogy."

The laws of psychology form the rules of teaching; consequently, pedagogy is a derived science and is based on psychology. For this reason the study of psychology should precede the study of pedagogy. Since the principles of teaching apply to all phases of instruction, pedagogy is also related more or less directly to all sciences found in courses of study. It relates to biology and physiology, in physical education; to logic, mathematics and the natural sciences, in intellectual education, and to history, literature and ethics, in moral education.

In the article EDUCATION, HISTORY OF, an account is given of the general trend of the various educational movements from ancient to modern times, and in this discussion of pedagogics the successive methods employed are given attention.

While all educational systems, even the most ancient, contain some valuable principles, those established previous to the Christian era have so little bearing upon modern theories and methods that their consideration is not necessary in a brief account.

I. THE HUMANISTS. *The Early Christian Fathers.* The period of the Humanists extends from the founding of Christianity through the Middle Ages. Their theories and principles

were the result of their purposes and ideals. Christianity set up new standards of life and revolutionized the thought of its followers. The purpose of education among the early Christians was to be able to interpret the Scriptures and to explain the subtlest truths of their religious belief. Education was consequently placed under the care of the Church, and the early Christian fathers were the first educators under this system. With few exceptions, religion, and reading and writing in Greek or Hebrew were the only subjects taught. Most of the leaders in the Church proscribed Latin and Greek authors, as their literature was that of the pagan world. The methods of instruction were dictatorial and arbitrary. Pupils were taught words before things, and were compelled to give unquestioned acceptance to the statements of their teachers. Independent thought or original investigation was not permitted. While some of these early teachers admitted the Latin and Greek classics, the same methods of instruction were employed by all.

The Schoolmen. The age of the Fathers was followed by that of the Schoolmen, and to this period most of the education of the Middle Ages belongs. During the greater part of the period, three systems of education were running parallel. These were monastic education, knightly education and secular education. Each of these systems was in marked contrast to the others. By the seventeenth century, monasteries were scattered through all the countries that had composed the Roman Empire. The prejudice against pagan writers had disappeared, and the educational work of these schools was much broader than at the beginning of the era. The course of instruction embraced the seven liberal arts, which were divided into two classes, the *trivium* and the *quadrivium*. The first included Latin grammar, logic and rhetoric; the second, arithmetic, geometry, astronomy and music. Reading and writing were included under grammar. The completion of the course required seven years; all secular studies were pursued with reference to their interest to the Church, and the Latin language was taught, to the universal neglect of the mother tongue. Later, logic absorbed the attention of the Schoolmen, who applied it to the development of theology. This produced a class of scholars who were noted for their ability to develop abstract theories and for their skill in reasoning on abstruse points of theology. Their system of education and methods of instruction tended to withdraw these men

from the world and abnormally to develop the memory and reason at the expense of the other mental powers. The educational system of the Schoolmen was unbalanced, but its methods became so firmly established that they have had a molding influence on the educational systems and theories of all succeeding centuries, and the great schools of some monastic orders, particularly the Benedictines, were at that time the leading educational institutions of the world.

Knightly education was the direct opposite of monastic. Its purpose was to fit the youth for the world. He was trained for war and the chase, to be truthful and to reverence women. He ignored the literature of Greece and Rome, but became reasonably conversant with his native language and dwelt upon the works of nature as the source of the noblest sentiments and purest joys. His inspiration was the love of glory, and his ideal, the knightly hero. Knightly education had a modifying influence on succeeding systems.

The secular education of the town or burgher schools had its origin in the necessities arising from the industrial conditions of the age. It was the practical education of its time and gave special attention to the reading and writing of the mother tongue, and to arithmetic, geography and history. In some schools, music and Latin were also added. These schools were under the supervision of the Church, and the methods of instruction were similar to those employed in the monastic schools; their course of study became, under the skilful direction of John Sturm, the foundation of that graded system of instruction that shaped the schools of Germany, England and America for three hundred years.

The Humanists based their system on the works and teachings of those who had preceded them in both the Christian and pagan world. While they infused the spirit of Christianity into much of their work and were inspired by lofty ideals of the relation between man and God, the supreme importance which they attached to the scriptures and their religious tenets made their instruction dogmatic. They also exalted words over things, stifled the spirit of free inquiry, gave undue prominence to formal reasoning and made learning a process of memorizing. Humanistic education failed to secure the development of all the powers of man.

II. THE REALISTS. The methods and theories of the Realists are in marked contrast to those of the Humanists. This school of thinkers and educational reformers may be said to

begin with the ascendancy of Lord Francis Bacon (See BACON, FRANCIS). Bacon is credited with being the originator of inductive philosophy (See INDUCTION; INDUCTIVE METHOD), in which inquiry, observation and experiment were substituted for the dictum of authority. Bacon's method is clearly illustrated in the following extract from Oscar Browning's *History of Educational Theories*: "The lock was to be opened; that was the problem. Other philosophers had tried key after key, each more complicated than the other. Bacon said, take the lock to pieces and examine its mechanism, and you will then be able to make a key which will open it." Bacon not only organized a new method of interrogating nature, but he also reclassified the sciences, showing the degree of progress which each had made, and their relation to one another. He was the first to classify pedagogics, or the science of education, as a department of psychology.

While Bacon's system of reasoning was opposed by the Schoolmen, it was welcomed by a class of vigorous thinkers who arose during the early part of the seventeenth century. These men applied Bacon's doctrine to education and promulgated theories which in time caused a strong reaction against the abstract education of the Humanists.

Ratich. The first of these reformers of note in the educational world was Wolfgang Ratke, or Ratich. He was a theorist, rather than a practical reformer, and did not succeed in establishing his theories or in modifying the educational system of his country; yet his aphorisms contain a number of principles which lie at the foundation of the most widely accepted theories of the present day.

John Amos Comenius. Comenius, a Moravian bishop, was a more vigorous and practical reformer than Ratich and may be considered the founder of modern methods of instruction. He was the first who successfully applied Bacon's method of inquiry to the instruction of children. The first reform instituted by Comenius was in the teaching of languages. This he accomplished through his book *Janua Linguarum Reserata* (The Gate of Tongues Unlocked) which appeared in 1631. This book possessed the following points of merit, (1) It was adapted to the pupil's capacity, (2) the lessons were carefully graded, (3) it taught things in connection with words. This work was translated into all the leading languages of Europe and also into Arabic and one of the languages of India. It

revolutionized the methods for teaching language wherever it went. In 1658 an enlarged and revised edition appeared under the title of *Orbis Sensualium Pictus* (The Illustrated World of Sensible Objects), in which all the objects named were accompanied by pictures. This was the first illustrated text-book in the world and was for many years the most popular text-book of Europe; its introduction was the beginning of systematic training of the powers of observation. (See COMENIUS, JOHN AMOS.)

Comenius also gave careful study to the organization of school systems, as well as to methods of instruction, and worked out a plan of graded instruction, based upon his theories, more complete than that instituted by Sturm. It included four grades of instruction, beginning with the home life of a child, where he was first trained by the mother, and extending to the university. According to this system, the child was to receive an elementary initiation into all studies. Moreover, the mental powers were to be trained in the order of their natural development, namely, observation, memory, imagination and reason. The following principles gleaned from the writings of Comenius will be recognized as constituting the basis of the most generally accepted educational theories of modern times:

"(1) Education is the development of the whole man. (2) Educational methods should follow the order of nature. (3) Both sexes should receive equal instruction. (4) Learning should be made agreeable. (5) There should be an easy gradation in studies. (6) Things naturally connected in themselves should be joined together in teaching. (7) Studies should be adapted to the capacity of the pupil. (8) Nothing is to be learned by heart that is not first thoroughly understood. (9) Words should be learned in connection with things. (10) The concrete should precede the abstract; the simple, the complex; the nearer, the more remote. (11) Things to be done should be learned by doing them."

These principles entitle Comenius to rank as one of the greatest educational reformers of the world. His system and methods aimed at the development of the whole man, but he was far in advance of his time. The thought of the seventeenth century was so strongly wedded to that of the sixteenth, that so radical a change as that which he proposed could be accomplished only in a long term of years.

The conflict between the Humanists and Realists, which began in the seventeenth century, was

handed down to the eighteenth and has been transmitted to successive generations, but with a constant convergence of the fundamental ideas in the two systems; and the beginning of the twentieth century saw a wise selection of the best in each, all blended and harmonized, in the most advanced educational systems of the world.

III. THE NEW EDUCATION. *Beginnings.* The eighteenth century was one of discontent; it was characterized by radical changes in political, religious and educational thought. During the century there was continual controversy between the Humanists and the Realists and, with scarcely an exception, the Humanists were in supreme control of public education, but their methods were to some extent modified by the works of Comenius. Various reformers arose who added much to educational progress. This was done more by their reiterating the principles of Comenius and placing them before the people in a new light and more attractive form, than by adding anything really new in the way of principles and theories. The three most celebrated reformers of this period were Locke, Rousseau and Pestalozzi, all living during the latter half of the century, and Pestalozzi doing his most effective work during the first quarter of the century that followed.

John Locke (See LOCKE, JOHN) considered that the mind at birth was like a sheet of blank paper, upon which ideas were to be impressed as they were acquired. He gave special attention to physical education and was the originator of the aphorism, "a sound mind in a sound body." He followed Comenius in his idea of teaching the mother tongue before other languages and laid special stress on moral and religious training.

Rousseau (See ROUSSEAU, JEAN JACQUES) was the great educational theorist of his age, and his treatise, *Emile*, was the most influential work of the century. Appearing in 1762, just as the Jesuits were driven from France, and written in an attractive style, it gained wide attention and was instrumental in molding public opinion. Rousseau bases his theory upon two fundamental principles, (1) nature is to be studied and followed; (2) education is an unbroken unity, extending from early childhood to maturity. He follows the method of observation instituted by Comenius and advocates manual training. *Emile* occupies an important place in the study of pedagogics, more on account of its influence than for any new principles which it contained.

Pestalozzi (See PESTALOZZI, JOHANN HEINRICH) is the reformer to whom the educational

progress of the nineteenth century owes the greatest debt. In both Catholic and Protestant countries great efforts had been made toward the development of popular instruction, but the public schools were nevertheless in a wretched condition. Domestics, discharged soldiers, corrupt artisans, degraded students and other grossly unfit persons were employed as teachers. To Pestalozzi, more than to any one else, is due the reform which has given us the primary school as found in Germany and the United States today. With the acceptance of Pestalozzi's principles and theories, the "new education" may be said to have fairly begun, though a long time has been required for its general extension to the public schools of Europe and America. As summarized by Dr. Payne, in *Painter's History of Education*, the principles of Pestalozzi, briefly stated, are:

(1) The principles of education are sought in human nature. (2) This nature is organic, consisting of physical, intellectual and moral capabilities, ready and struggling to develop themselves. (3) The function of the educator is both negative and positive. He must remove impediments to the learner's development, and he must also stimulate the exercise of his powers. (4) Self-development begins with sensations received through the senses. These sensations lead to perceptions which, registered in the mind as conceptions or ideas, constitute the basis of knowledge. (5) Spontaneity and self-activity are the necessary conditions under which the mind educates itself and gains power and independence. (6) Practical aptness depends more on exercise than on knowledge. "Knowing and doing must, however, proceed together. The chief aim of education is the development of the learner's powers." (7) All education must be based on the learner's own observation; . . . "this is the true basis of all knowledge." (8) What the learner has gained by his own observation has become an actual possession, which he can explain or describe in his own words. (9) The learner's growth necessitates advancement from the near and actual to the more remote; hence, from the concrete to the abstract, from particulars to generals, from the known to the unknown.

Principles and Phases. All these principles are embraced in the "new education," and the pedagogical movements of the last half of the nineteenth century have been along the line of their application. Attempts to solve the problems of education have been very generally studied under the following phases:

1. *Child Study.* The study of children from a physiological, as well as a psychological, point of view has been prosecuted in Germany and the United States with a high degree of success. Much valuable information has been collected on the rapidity of growth in different years, the condition of the senses as to normal development and the relation of defective senses to the mental development of the child. The maximum rate and precision of voluntary movement have been tested in thousands of children, and the results have been taken into consideration in the teaching of drawing, writing and oral reading. Endurance and fatigue, aptitudes and interests, the contents of children's minds, the scope of the memory at different ages, the rapidity of improvement in different children of the same age and many other conditions bearing directly or indirectly upon instruction in the elementary school have been determined and placed before the teachers for their guidance.

2. *The Subject-Matter of Education.* This subject has been the cause of contention between the Humanists, who have placed great stress upon the ancient classics, and the Realists, who consider such subjects as the natural sciences, modern languages and history as the most important. During the last half of the nineteenth century, the more practical subjects have rapidly gained ground in American and German colleges and universities, and the present tendency is to grant them precedence over Latin and Greek. This subject has also caused a great deal of discussion concerning the methods of elementary instruction; these are generally known as the concentric and the historical methods. According to the concentric method, the child is taught only a few central facts in the primary grade, and these are expanded and added to from year to year as his mental development increases. The historical method proceeds on the assumption that the child, during his mental development, passes through substantially the same stages as the race has passed through in reaching its present stage of civilization. These stages are known as culture epochs; and all subjects containing a human element, such as history and literature, should be arranged to conform to these various culture epochs. The leading advocates of the historical method are the German educators Ziller and Herbart, and they have found a large following in Germany and the United States.

3. *Coördination and Correlation of Studies.* These terms mean, respectively, deciding what

studies shall be given equal rank in a course of study, and what studies are naturally related to one another. The solution of this problem is largely dependent upon the theory of instruction adopted, and its discussion in the United States is of quite recent origin. It is agreed that such an association of studies as leads each to reinforce the others enhances the pupil's interest in his work, gives him a better understanding of the subjects and strengthens his power of volition. Those who believe moral culture to be the greatest aim of education consider such studies as history and literature of first importance; those who accept the idea of the philosophical unity of knowledge as a basis for coördination place the various branches of natural science, ethnology, anthropology and history as the central, or knowledge, subjects; while others consider that there are independent coördinate groups of studies, and that the subjects of each group should be correlated according to their natural relations.

4. Methods of Teaching. The dependence of methods of instruction in elementary schools upon the laws of psychology is now universally recognized, and more attention is given to the professional training of teachers than ever before (See NORMAL SCHOOL). This result has been brought about very largely through child study and the study of experimental psychology. The trained teacher understands that instruction is limited by the knowledge, aptitude and interest of the pupils, and that methods of instruction must meet these conditions. The multiplication of normal schools, the establishing of departments of pedagogy in many of the leading colleges and universities of the United States and the unprecedented growth of pedagogical literature during the last quarter of the nineteenth century are evidence of the general interest in education and of progress in perfecting the public school systems of the country. See EDUCATION; PSYCHOLOGY; CHILD STUDY; METHODS OF TEACHING; COMMON SCHOOLS.

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McMurry's *General Method*, Compayre's *Lectures on Pedagogy*, Page's *Theory and Practice of Teaching*, McMurry's *Method in the Recitation*, Tompkins's *Philosophy of Teaching* and Arnold's *Waymarks for Teachers*; on school management, Wickersham's *School Economy*, Baldwin's *The Art of School Management*, and White's *School Management*.

Pedee', GREAT, a river of North Carolina and South Carolina, known in part of its course as the Yadkin. It rises in North Carolina and flows south and southwestward and enters the Atlantic Ocean through Winyaw Bay. The Little Pedee, its most important tributary, rises in North Carolina and flows southward and enters the Great Pedee about 40 miles above its mouth.

Ped'imént, in classic architecture, the triangular mass resembling a gable, above the entablature at the end of buildings or over porticoes. The pediment is surrounded by a cornice, and is often ornamented with rich sculpture. In the architecture of the Middle Ages small gables and triangular decorations over doors, windows, niches, façades and other parts of buildings are called pediments. The finest examples of pediments are to be seen in the Parthenon at Athens and in the temples of Aegina and Olympia.

Pedom'eter, an instrument like a watch, carried in the pocket. It is so constructed that the motion of the body causes a lever to move every time the bearer steps. Before a person can tell the distance he has walked, he must measure the distance covered by a certain number of steps, and from this he must determine the average length of his step. The pedometer registers the number of steps taken. See CYCLOMETER.

Pe'dro II (Portuguese pron., *pa'dro*), (1825-1891), emperor of Brazil, succeeded to the throne on the abdication of his father, Pedro I, in 1831. Brazil prospered greatly under the rule of Pedro II, who did much to develop its resources in every direction. In 1871 he issued an imperial decree for the gradual abolition of slavery, which totally ceased in Brazil in 1888. He made several visits to Europe, and was deposed by the revolution of November, 1889.

Peeks'kill, N. Y., a village in Westchester co., 40 mi. n. of New York City, on the east bank of the Hudson River, just below the highlands, and on the New York Central railroad. It contains extensive manufactures of stoves, fire brick, hats, underwear, foundry products and other articles. The place was settled in 1764 and was named in honor of Jans Peek, an early Dutch

navigator. Near the village is the famous Robinson House, where generals Israel Putnam and Samuel H. Parsons made their headquarters in 1778-1779, and where Benedict Arnold in 1780 first heard of the capture of Major John André. Population in 1910, 15,245.

Peel, ROBERT, Sir (1788-1850), a British statesman, educated at Harrow and at Oxford. After entering Parliament in 1809, he was appointed undersecretary for war and the colonies and later was made chief secretary for Ireland. His attitude toward the Irish question brought him into conflict with O'Connell and the extreme Catholic party, and a duel between him and O'Connell was narrowly averted. He established the Irish constabulary while in this office and later established the London police force, which took from him the names of "Peelers" and "Bobbies." He was returned to Parliament in 1817 from Oxford, but some years later his changed views on the Catholic emancipation question led to his defeat. In 1834 and in 1841, Peel was prime minister, and during his second term in that office he changed from a Conservative and supporter of protection to a free trader. He also gave his support to a repeal of the Corn Laws.

Peer, in general, signifies an equal, one of the same rank and station. In this sense it is used by the common law of England, which declares that every person is to be tried by his peers. Peer also signifies in Britain a member of one of the five degrees of nobility that constitute the *peerage* (duke, marquis, earl, viscount, baron), or, more strictly, a member of the House of Lords.

Peg'asus, in classical mythology, a winged horse, formed by Neptune from the drops of blood which fell from Medusa's head as Perseus flew with it over the sea. This beautiful steed was the favorite mount of Apollo and the Muses. Bellerophon captured Pegasus and with his aid put to death the chimera.

Pei-ho, *pa'ho'* or *pi'ho'*, a river of China, which rises near the Great Wall, n. of Peking, flows southeast and empties into the Gulf of Pe-chi-li. Its total course is about 350 miles, 100 of which are navigable. At its mouth is the small town of Taku.

Peipus, *pi'poos*, a lake of Russia, surrounded by the governments of Petrograd, Esthonia, Livonia and Pskov. It is about 75 miles in length and 32 miles in width, and has low, sandy banks, which are in most places wooded. It discharges itself by the Narova into the Gulf of Finland. It is well supplied with fish.

Pe'kin, ILL., the county-seat of Tazewell co., 10 mi. s. of Peoria, on the Illinois River and on the Illinois Central, the Atchison, Topeka & Santa Fé, the Chicago & Alton, the Cleveland, Cincinnati, Chicago & Saint Louis and several other railroads. The city is an important railroad center, in a fertile agricultural district, near productive coal mines. There are manufactures of agricultural implements, wagons, beet sugar, glucose, alcohol, fertilizers and lumber, foundry and clay products. It has a free library and good school buildings. The place was settled in 1829 and was incorporated in 1850. Population in 1910, 9897.

Pe'king', the capital of the Chinese Empire, is situated in the Province of Chi-li, between the Pei-ho and the Hun-ho rivers, 100 mi. from the mouth of the river, at the Gulf of Pe-chi-li. It is at the head of the Grand Canal and about 50 mi. s. of the Great Wall of China. The city is surrounded by high walls, which are entered by sixteen gates. The outer wall is 30 feet high, 25 feet thick at the base and 12 feet at the top, with square towers at intervals of about 180 feet, rising to a height of 50 feet and projecting outward in the form of buttresses. The circuit of the walls is about 30 miles. The city is divided by a wall, extending east and west, into two parts, known as the Tartar, or Inner City, which occupies the northern portion of the site, and the Chinese, or Outer City. The wall of the Inner City is 40 feet high, 62 feet thick at the base and 34 feet at the top.

The Chinese City is the newer portion and was built during the thirteenth century. It contains the greater part of the population and is the business portion of the Chinese capital. Among its important buildings is the Altar of Heaven, with its surrounding temples and shrines; the Temple of Heaven, in which the emperor at midnight in the winter solstice offers sacrifices, and the Temple of Agriculture, near which, each spring, the emperor plows one or more furrows to inaugurate the opening of the season. The streets in this part of the city are lined with shops, which contain wares of almost every description.

The Imperial City, or Tartar City, is entered through gates in the wall dividing it from the Chinese City, also through gates in the northern wall. Within this part of the city are found the buildings of the foreign legations, which, since the Boxer outbreak in 1900, have been strongly fortified. The Tartar City contains three enclosures, concentrically arranged. The outer

enclosure is occupied by the general populace. The second, which is separated from the first by a wall, contains the government offices, temples, parks and an artificial lake on the west. In the center of this enclosure, known as the Imperial City, is the Purple, or Forbidden City, which is the residence of the emperor and his immediate family and the highest officials. This area is considered sacred and is closed to foreigners, except for special missions. It contains the imperial palace, pleasure grounds, pavilions and reception halls. The walls of this enclosure, together with the roofs of all the buildings, are covered with yellow tiling.

The industries of Peking are almost entirely related to the government, only such commercial and manufacturing enterprises being carried on within the city as are necessary to supply the wants of its population. The administration of the great Empire brings together a large number of officials and their families. It is at Peking that the government examinations are conducted, and the examination hall has cells, or small rooms, sufficient to accommodate 10,000 students at a time. The Imperial University and Imperial Observatory are also located here. The city contains many Buddhistic temples and churches of a number of Christian missions, also mission schools. While the streets are reasonably broad, only a few of them are paved. Carriages and teams are seldom seen, and transportation is either by small, covered carts or by sedan chairs. Since the occupation of the city by foreign troops in 1900, considerable progress has been made in improving the streets and the sanitary condition.

Peking has been settled for so many centuries that it is not known when it began. It was made one of the capitals by the Khitan Tartars in 937 and was named Nanking, or the Southern Capital. In 1264 Kubla Khan made it his capital and built the present Tartar City, which was the Kambalu of Marco Polo. It was occupied by the Manchus in 1643 and since then has been somewhat improved. It had never been entered by foreign troops until 1900, when the allied forces took possession of the city and raised the siege of the foreign legations. This occupation continued until September, 1901. The city is connected by telegraph with the important centers of the world, and in 1897 rail connection was established between it and Tien-tsin, later with Mukden and thence with Europe, through the Trans-Siberian railway. Population, including suburbs, about 1,000,000.

Pelas'gians, a prehistoric race, widely spread over the whole of Greece, the coasts and islands of the Aegean and Asia Minor and Italy.

Pelee, pa la', MONT. See MARTINIQUE.

Pel'ican, the name of several different species of web-footed birds, whose striking peculiarity is the great pouch that lies under their lower mandibles. They are larger than swans, have great expanse of wings and are excellent swimmers. They live in flocks on the sea coast, lake shores and along rivers, feeding chiefly on fish, which they capture with great skill. The pouch of naked skin is capable of holding several fish, which the bird may preserve for its own consumption or may carry to its nest for its young. It is said that gulls sometimes, without apparent offence, perch upon the heads of the pelicans and take away such fish as protrude from the big bills. Although pelicans swim well and fly well,



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they are very clumsy on land and have difficulty in rising therefrom in flight but many species perch habitually on trees and dash into the water after their prey, sometimes disappearing wholly from sight with a somersault. Their nests are rough, clumsy affairs, usually built in villages, several pairs of birds occupying the same trees, in company, also, with egrets and herons. If undisturbed, they will come from year to year to the same nests. The young are fed with partially digested food, which is prepared for their benefit by the parents. The *common*, or *white*, *pelican* has a delicate white plumage, tinged with rose or pink. One species, found in temperate North America, lacks the rosy tint and has a pendent

crest. In general, the pelicans prefer a warm or tropical country

Pellagra, *pee la'grah*, a disease caused by eating corn which has been harvested before it was ripe and allowed to ferment. It is believed that the disease is caused by the growth of fungi which constitute the smut (See SMUTS). Pellagra has long been prevalent in Egypt and European countries, but it usually appears in a mild form. In 1908 pellagra appeared in an acute form in several of the Southern states, and with scarcely an exception proved fatal, notwithstanding the efforts of the best physicians. Pellagra begins with disturbances in the digestive organs, which are followed by sleeplessness and often an eruption on the skin. In many cases headache and backache and spasms occur.

Pelopidas (?-364), a Theban general and statesman. The supremacy of the Spartan faction in Thebes forced Pelopidas, with other exiles, to take refuge in Athens, but he returned in 379 B. C. and succeeded in overthrowing the Spartan party and recovering the citadel of Thebes. In the war which followed with Sparta, Pelopidas distinguished himself in the battles of Tegyra and of Leuctra, by which Thebes became for a time the leading power of Greece. In 364 he was sent against Alexander of Pherae, tyrant of Thessaly, whom he defeated, though he himself was slain.

Peloponnesian, *pel'o pon ne'shan*, **War**. See GREECE, subhead *History*.

Peloponnesus, the peninsula which forms the most southern part of Greece, now called the Morea. It is joined to the remainder of the country only by the narrow isthmus of Corinth. The ancient Peloponnesus was divided into six states, Messinia, Argolis, Laconia (Sparta), Elis, Arcadia and Achaea. See GREECE, subhead *History*.

Pelops, in Greek mythology, son of Tantalus, king of Phrygia. Tantalus, who was a favorite with the gods, one day served to some of them a feast, the chief dish of which consisted of his son, Pelops. All of the gods recognized the dish that was set before them and refused to eat, except Ceres, who, deep in mourning for her daughter, noticed nothing and ate a part of the shoulder of the boy. Pelops was afterward restored to life by the gods, and Ceres furnished for the lost shoulder one of ivory. With the aid of Neptune, Pelops married Hippodamia and succeeded his father-in-law in the rule of the vast kingdom which, according to legend, was called after him

Peloponnesus. Atreus and Thyestes were sons of Pelops.

Pel'vis, **THE**, a bony basin, formed by the two innominate bones and the sacrum. Into the sockets of the innominates are fitted the thigh bones. The lower part of the intestines is in the pelvic cavity. See SKELETON.

Pem'berton, JOHN CLIFFORD (1814-1881), an American soldier, born at Philadelphia. He graduated at West Point in 1837 and entered the artillery service. He served in the Mexican War and became major after the Battle of Molino del Rey. He resigned from the service at the outbreak of the Civil War, entered the Confederate army and soon was made major general. Pemberton conducted a skilful defense of Vicksburg before a continuous bombardment, from the middle of May until July 4, when he surrendered. After the war he became a planter in Virginia, but moved to Pennsylvania in 1876.

Pem'mican, the name of a food formerly prepared and extensively used by the indians living in the northern part of North America. Originally it consisted of dried lean meat, of the buffalo or deer, pounded to a powder and mixed with boiling fat, then pressed into cakes and packed in cases until needed. Beef is now used in the place of buffalo or deer meat. When properly prepared, pemmican contains a large amount of nourishment in a small space. For this reason it is still used by hunters and traders who travel long distances through the sparsely settled regions of Canada.

Pen, an instrument for writing with a fluid. Pens have been in use from very early times, and in each age they were adapted to the material on which the characters were to be made. The Roman's pen consisted of a metal stylus with a stiff point and was used for writing on tablets coated with wax. In Greece and in Eastern countries a hollow reed was used, and this undoubtedly led to the quill pen. Quill pens were made of the quills of the goose and crow and were used for several centuries before they were replaced by metal pens. The quills were taken from the wings of the bird and placed in hot sand until dry, when the pen was made by whittling the quill into shape with a small knife.

The manufacture of steel pens as a business was commenced by Joseph Gillott in 1820. Mr. Gillott succeeded in making a pen of thinner and more elastic steel and in giving it a better temper and finish than had been previously done. The method which he established has, with some improvements, been followed until the present

time. Pens are now manufactured by machinery. Steel of the best quality is used. This is rolled into thin sheets six feet long and about one and one-half feet wide. These sheets are cut into strips, equal in width to the length of two pens. The strips are then heated to a dull red, in tight iron boxes, and allowed to cool slowly. When cooled they are cleaned and rolled with great care to the necessary thickness. Blanks, of the shape and size of the pen, are then punched from the plates. The blanks are then stamped and slit on each side of the point, so as to make the pen more flexible. They are then heated and rounded by being stamped with a die, which fits into a mold. The pens are then tempered, and the points are ground and split. The pens are then sorted, the imperfect ones being thrown out, and the others packed in boxes of one gross each. Birmingham, England, leads in the manufacture of steel pens and turns out over 30,000,000 a week. In the United States there are large manufactories in New York. The entire quantity of steel used for making pens each year is more than that used in the manufacture of all the guns, swords and needles in the world for the same length of time. Gold pens have their point tipped with iridium, to prevent wearing. Fountain pens contain a hollow penholder, which can be filled with ink, which flows as needed for use.

Penance, *pen'ans*, the punishment by which repentant sinners seek to atone for their offenses. By the Roman Catholic Church it is believed to be of divine origin (*Matt.* xviii, 18; *John* xx, 23) and is reckoned as one of the seven sacraments. It includes contrition, confession and satisfaction, followed by absolution pronounced by the priest. The early Christians showed their belief in penance by their sorrow for sin, their self-inflicted pain, their fasts and the strewing of ashes on the head. Penance is not recognized by Protestant churches.

Penang', an island belonging to Great Britain, lying at the north entrance of the Malacca Strait, off the western coast of the Malay Peninsula. Its area is 107,000 square miles. The greater part of the surface is level, although there is a mountainous tract in the north. The island produces coconuts, areca, pepper, nutmegs, cloves, rice, sugar, coffee and indigo. There are large supplies of tin in the mountainous region. Georgetown, the capital and port of the settlement, is a growing town with a large commerce. Population of the island in 1911, 278,003.

Penates, *pe na'teez*. See **LARES** AND **PENATES**.

Pencil, *pen'sil*, an instrument used for writing or drawing. The earliest artists no doubt used pieces of colored earth or chalk, cut into forms convenient for holding in the hand. Such pencils were used in the monochromes, or one-color pictures, of the Egyptians and Greeks, but in the fourth century the Greek artists, on the introduction of wet colors, used fine hair brushes, made of hairs of the camel, badger, squirrel and goat. The use of lead for marking on papyrus was of very ancient origin, and because of this fact lead pencils are probably so called, though they are made not of lead, but of graphite, sometimes called plumbago, or black lead.

The manufacture of graphite pencils began in England in the sixteenth century, when a valuable mine of pure graphite was found at Barrowdale, Cumberland. This mine became exhausted in 1850, and afterwards powdered graphite, mixed with clay, was used. Graphite is now mined at Schwartzbach, Bohemia; at Passau, Bavaria, at Ticonderoga, N. Y., and in other parts of the United States. In the manufacture of pencils powdered graphite, free from all impurities, is mixed with pipe clay, the quantity depending on the degree of hardness required. For hard pencils they are mixed in equal parts, and for ordinary writing pencils the proportions are seven parts of clay to ten parts of graphite. After being ground together with water for several hours, the doughy mixture is shaped into leads, by being placed in an iron cylinder, with a plate in the bottom, which has holes of the same size as the leads to be made. By the use of a piston, worked by a screw, the mixture is squeezed out in coils through the holes. While wet, the coils are straightened, cut into pieces and allowed to dry. Pine and red cedar are generally used for casing. The wood, cut into little slabs the width of six pencils, is passed through a machine which makes the grooves. The graphite sticks are placed in these grooves, and another grooved slab is glued to it. The blocks are then cut into pencils, by being run through a machine with revolving knives, and are finished into various styles. Colored pencils are made by mixing colored clay or chalk with wax, and slate pencils are made from a soft variety of slate. The manufacture of lead pencils is extensive in England, France, Bavaria, Austria and the United States. The largest pencil manufactory in the world is that of the Joseph Dixon Crucible Company, at Camden, N. J.

Pen'dant, in architecture, a hanging ornament, used in the vaults and timber roofs of

Gothic buildings, more particularly in late Gothic work. In vaulted roofs, pendants are of stone and generally are richly carved; in timber roofs, they are of wood, variously decorated. Fine examples of stone pendants are to be seen in the chapel of Henry VII, at Westminster Abbey.

Pend d'Oreille, *pahN do ra'y'*. See KALISPEL.

Penden'tive, a triangular section of masonry, which supports a cupola or dome. The Byzantine architecture of the sixth century introduced the use of pendentives, making it possible to erect domes on rectangular or polygonal walls. The power of pendentives is shown in the Church of Saint Sophia at Constantinople. See DOME.

Pen'dleton, Ore., the county-seat of Umatilla co., about 45 mi. s. w. of Walla Walla, Wash., on the Umatilla River, and on the Washington & Columbia River railroad and the line of the Oregon Railroad & Navigation Company. The town is in a great wheat-growing region, where the raising of cattle, sheep and horses is also extensively carried on. The river furnishes good water power, and there are flour and woolen mills, wool-scouring plants, machine shops, ice works and other factories. The municipality has electric lights and owns good water works and sewage systems. There are two academies, three banks, two daily and two weekly newspapers, four hotels, a hospital and a number of churches. Population in 1910, about 5000.

Pendleton, GEORGE HUNT (1825-1889), an American lawyer and statesman, born at Cincinnati, Ohio. He studied law, was admitted to the bar and achieved distinction in his profession. He was elected to the state legislature and then to Congress in 1856, where he served four successive terms. During the Civil War he was a constant opponent of the administration, and for his severe criticisms he incurred public censure. He was nominated by the Democrats for vice-president of the United States in 1864, became a conspicuous figure in the Greenback party and in 1879 was elected to the United States Senate. There, as chairman of the committee on civil service reform, he fought valiantly for the improvement of the public service, being the author of the Pendleton Bill, which became a law January 16, 1883, and firmly established the merit system of public appointment (See CIVIL SERVICE AND CIVIL SERVICE REFORM). In 1885 he was appointed minister to Germany and held the position until his death at Brussels.

Pen'dulum, a weight suspended from a fixed point, so that it will swing freely to and fro by

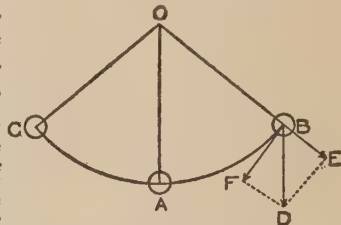
the force of gravity and the impulse which it receives from its own motion. A small, heavy body, suspended from a fixed point by a string and caused to vibrate without much friction, is the simplest form of pendulum. In the figure, *A* is the weight, *O* the point of suspension, and *B* and *C* the ends of the path over which the pendulum swings. The path *CAB* is called the *arc*, and the movement of the pendulum from *B* to *C*

constitutes a *vibration*. The force of gravity tends to draw the ball at *B* in the direction of *BD*, but the resistance of the string, *OB*, causes it to take the direction of the resultant, *BF*, which is at right angles with *BE*, and thus to swing in the arc *CAB*. The distance from the lowest point in the arc to either end, as *AB* and *AC*, constitutes the *amplitude* of the vibration. Clock pendulums are usually made by the hanging of a circular piece of metal, called the *bob*, or *disk*, to a wire, which is attached by its upper end to the frame of the clock.

The time of vibration of a pendulum depends upon its length. A pendulum which will vibrate seconds in the latitude of New York is about 39.1 inches or .993 meters long. The vibrations are governed by the following laws:

- (1) In the same pendulum, all vibrations of small amplitude are made in the same time.
- (2) The times of vibration of different pendulums are proportional to the square roots of their respective lengths. If a pendulum to vibrate seconds must be 39.1 inches long, one to vibrate three times as fast would have to be one-ninth as long.
- (3) The time of vibration for the same pendulum will vary in different places, since it decreases as it is moved from the equator to the poles.

Since the rod in most clock pendulums lengthens in summer and shortens in winter, it is necessary that means for preserving the uniform length of a pendulum be provided. In clocks known as regulators, such as are used by watch makers, the pendulum rod consists of a frame of rods of different metals, so arranged that as some expand downward, others expand upward, thus keeping the mean length of the pendulum the same. Another style, known as the mercurial pendulum, has but one rod, but the weight consists of a



cup containing mercury. As the rod lengthens, the mercury expands upward, and as the rod shortens, the mercury contracts downward, thus preserving the length of the pendulum. See CLOCK.

Penel'ope, in Greek mythology, the wife of Ulysses. Shortly after the birth of his son Telemachus, Ulysses set out on the expedition against Troy, and during his twenty years of absence Penelope was constantly besieged by a host of suitors. She tried to rid herself of them by promising them that she would make a decision as soon as she had finished a piece of tapestry which she was weaving. Each night, however, she raveled what she had done during the day. When her suitors became aware of this device, they grew more clamorous, and Penelope stated that she would marry any one of them who could bend the bow of Ulysses, knowing well that none of them was strong enough to do this. When the day of the trial came, an aged beggar who had made his way to the palace entered with the suitors and, after they had all tried, took the bow and bent it easily. He then threw off his disguise, showed himself as Ulysses and put to death his wife's persecutors.

Pen'guin, a web-footed bird of the Antarctic regions, which corresponds to the auk of the North Polar regions. On shore the penguins are awkward birds, crawling along with rapidity on their bellies by the aid of their short wings, which are entirely useless for flight. In the water, however, the birds swim with great rapidity, using their wings as paddles. They nest in colonies, and while the females are sitting on the eggs, they are fed by the males and become very fat. Penguins are often seen during this season sitting erect in long straight lines, like soldiers, arranged in divisions, according to age. Their breasts are covered by a silvery plumage that is so soft, close and velvety that fur dealers use it extensively in making muffs and similar articles. There are several varieties, of which the common penguin, found in immense numbers about the Straits of Magellan and in the Falkland Islands, is the leading type.

Peninsula Campaign, the name given to the campaign of the Federal Army of the Potomac under General McClellan against Richmond, Va., between April and July, 1862. It was so called because of the attempt to reach Richmond by a march along the peninsula between the York and James rivers (See MCCLELLAN, GEORGE BRENTON; CIVIL WAR IN AMERICA). McClellan's army of 120,000 men arrived at

Fortress Monroe in April. Advancing a short distance, McClellan took up a position before Yorktown, where he maintained a month's siege, but before he was ready to make a final assault the Confederates had escaped. They were pursued by Hooker, who suffered a reverse at Williamsburg. McClellan then continued his march up the peninsula. McDowell, who was at Fredericksburg, was ordered to reinforce McClellan, but 20,000 Confederates, under Stonewall Jackson, by rapid marches through the Shenandoah Valley, attacked the Federal force under Banks with such success at McDowell, Front Royal



PENGUIN

and Winchester, that McDowell was ordered to send 20,000 men into the Shenandoah to catch Jackson. The latter succeeded easily in making his escape.

Meantime, on May 31, Johnston attacked the vanguard of McClellan's army at Fair Oaks, but was defeated. In this engagement, Johnston was wounded, and Lee became the commander of the Confederate force before Richmond, known as the Army of Northern Virginia. After fortifying his position, Lee dispatched reinforce-

ments to Jackson in the Shenandoah Valley, with orders to attack the right wing of the Federal lines under Porter. In pursuance of this plan, A. P. Hill opened a battle at Mechanicsville on June 26, but was repulsed with great loss. This battle opened what is known as the Seven Days' Battles. Porter then withdrew to Gaines's Mill, where he was attacked on the following day. He sustained the attack until the middle of the afternoon, against a force outnumbering his more than two to one, but was finally compelled to retreat, leaving several guns in the hands of the enemy. This gave the Confederates opportunity to cut McClellan's communication with his base of supplies at White House, on the Pamunkey River. McClellan therefore decided to transfer his base to the James River. Destroying all stores and supplies that could not be moved, and abandoning 2500 sick and wounded to the enemy, he began a difficult march across White Oak Swamp and after a time was hotly pursued by the Confederates. They overtook the retreating Federals at Savages' Station, but were defeated after a severe engagement. Another severe battle was fought at Frazer's Farm, between Longstreet and Hill of the Confederates, and McCall, Heintzelman and Sumner of the Federals, resulting in a drawn contest.

The Federals reached Malvern Hill, near the James River, on July 1. There they were attacked by the main Confederate army, under Lee, who thought that the force which he was confronting was only a remnant of McClellan's army. The Confederates, naturally, were defeated at every point with fearful slaughter (See MALVERN HILL, BATTLE OF). Nevertheless, McClellan ordered a precipitate retreat, and after reorganizing his forces at Harrison's Landing, he embarked for Washington, thus ending the Peninsula Campaign. The total loss during the Seven Days' Battles to the Federal armies was about 15,000, while that of the Confederates was probably a little less. The campaign had accomplished nothing, except weakening the confidence of the Federal army, strengthening that of the Confederates and leaving in the hands of

the Southern armies many prisoners, as well as a vast amount of artillery and ammunition.

Peninsular War, THE, a struggle caused by the intrigues and ambition of Napoleon, who proposed the partition of Portugal and placed his brother Joseph upon the throne of Spain. For a time the whole peninsula was occupied by French troops, but the Spanish and Portuguese peoples rose in defense of their liberties and waged a fierce guerrilla warfare against the invaders. Of the memorable struggle which ensued, the main features were the retreat of Sir John Moore to Coruña, and his death there; the accession of Sir Arthur Wellesley to the supreme



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command; his formation of the celebrated lines of Torres Vedras, where he held the French armies in check until he had accomplished the complete liberation of Portugal, and his subsequent victorious march through Spain, marked by the great battles of Salamanca and Vitoria.

Penn, WILLIAM (1644-1718), the founder of the State of Pennsylvania, born in London. While attending Christ Church, Oxford, he accepted Quaker views, which caused his expulsion from the university and led his father to adopt harsh measures against him. In 1668 Penn became a Quaker preacher, and on account of an essay, entitled *The Sandy Foundation Shaken*, was imprisoned in the Tower for seven months. During this time he wrote his most celebrated works, *No Cross, No Crown* and *Inno-*

gency with Her Open Face. The persecutions of Dissenters continuing to rage. Penn turned his thoughts toward the New World. From his father he had inherited a claim upon the government of \$80,000, and in settlement of this claim the government in 1681 granted him large territories in North America, including the present State of Pennsylvania, with the right to found a colony or society with such laws and institutions as expressed his views and principles. A settlement was established in 1682, and a little later Penn came to America and laid the foundations of his colony on a more free and democratic basis than had at that time been allowed in the world. Members of all denominations and countries gathered there; the city of Philadelphia was laid out upon the banks of the Delaware, and the colony soon came into a most flourishing condition. Penn remained in the province about two years. At the Revolution of 1688 his intimacy



WILLIAM PENN

with the abdicated monarch created suspicions, and he was accused of treason but was several times acquitted. In 1699 he again sailed for Pennsylvania, intending to make it the place of his future residence. However, he returned to England in 1701, leaving the management of his affairs to an agent named Ford, by whose dishonesty Penn was financially ruined. When Ford died he left claims against Penn, that were pressed to such a degree that Penn allowed himself to be thrown into prison to escape extortion. His affairs were finally adjusted by his friends and he was released, but the impris-

onment fatally injured his health, and he died in 1718. His works were published in 1782 in five volumes, and again in 1825 in three volumes. His *Memoirs*, in two volumes, were edited in 1813. Among the best biographies are that by Janney (1852) and *The True William Penn* by Fisher.

Penn'sylva'nia, the KEYSTONE STATE, one of the Middle Atlantic states, bounded on the n. by New York, on the e. by New York and New Jersey, on the s. by Delaware, Maryland and West Virginia and on the w. by West Virginia and Ohio. A small portion of the northwestern corner borders on Lake Erie. The length of the state from east to west is 302 mi., and from north to south, 157½ mi. The area is 45,126 sq. mi. Population in 1910, 7,665,111.

SURFACE AND DRAINAGE. The surface of Pennsylvania is divided into three distinct regions. The southeastern region occupies all of that portion of the state between the eastern and southern boundaries and the first range of mountains and is a part of the Piedmont plateau (See **PIEDMONT REGION**). The eastern portion of this region is at sea level, and the surface rises by gradual slopes from this low plain to an altitude of 500 feet at the foot of the mountains. The surface is somewhat rolling and is crossed in a number of places by chains of hills. The largest of these, known as South Mountain, extends entirely across the state, in a southwest and northeast direction. The second, or highland, region, comprises the mountainous section, which extends across the state from the northeastern corner in a southwesterly direction. Beginning with the low ridge known as South Mountain, this region comprises several parallel ranges of mountains separated by intervening valleys. The most important of these on the east is Blue Mountain, which in New Jersey is known as the Kittatinny range; through this the Delaware River cuts its way, forming the famous Delaware Water Gap. West of Blue Mountain are a number of ranges with different names, all of which belong to the Alleghany Mountains. All of these mountains have steep slopes on the eastern side and gradual slopes on the western. Nowhere do they reach an altitude of 3000 feet, and their average height is from 1000 to 2000 feet. Streams flow through the intervening valleys, and the Susquehanna cuts its way across the ranges. Much of this region is covered with forests. The third region, known as the Alleghany plateau, occupies fully one-half of the state and lies to the west of the mountain region. This is

a high plateau, varying in altitude from 1000 to 2500 feet and containing many deep valleys and steep slopes, these having been formed by streams which have worn their channels through the soft strata underlying the surface. The high plateau extends almost to the shore of Lake Erie.

The eastern part of the state is drained by the Delaware River, which receives a number of short tributaries. The most important of these are the Schuylkill and the Lehigh, the former entering the Delaware at Philadelphia and the latter at Easton. A few streams in the southeastern corner enter the Susquehanna. This river drains the northeastern and central parts of the state. It is formed by its North and West branches, which unite at Northumberland. It flows entirely across the state in an irregular course and receives numerous tributaries, most of them shallow, rapid mountain streams, the largest being the Juniata. The Alleghany plateau is drained principally by the Ohio and the two great streams from which it is formed, the Allegheny and the Monongahela. The region bordering on Lake Erie is drained into the lake by a few short streams. A small area in the south is drained into the Potomac River. There are in the mountains occasional tarns, or mountain lakes, but Pennsylvania has no lakes of any importance.

CLIMATE. The climate of the state is different in the three natural divisions. In the northwest and west, heat and cold are excessive and changes are abrupt. In the north and mountain regions, the winters are severe and the summers delightfully cool. The climate of the eastern section is marked by irregular alternations of the seasons. But the climate is, in general, healthful. The mean temperature at Philadelphia is 54°. The average annual rainfall ranges from 36 inches, in the western counties, to 42 inches, at Philadelphia. Heavy snows fall on the mountains in winter, and the rivers of the western half of the state are often flooded in the spring.

MINERAL RESOURCES. Pennsylvania contains the largest deposits of anthracite coal known. The anthracite mines are found in seven districts, at Pittsburg, Wilkesbarre, Hazleton, Shenandoah, Ashland, Pottsville and Scranton, and the output of anthracite exceeds that of any other state or any country. In the western part of the state are extensive measures of bituminous coal. These are located in the Monongahela City, Irwin, Mercer, Towanda, Connellsville, Johnstown, Idlewood and Philipsburg districts. Many of the coal measures contain layers

of sandstone, iron ore, limestone and fire clay between the seams of coal, and much of this material is mined with profit in connection with the fuel. There are marble quarries near Philadelphia, lead and copper mines at Phoenixville and nickel deposits in Lancaster County. Slate is also found in large quantities in the state, and a number of counties contain extensive beds of iron ore, which have been worked with profit for many years. In the western part of the state is the oil field, in which petroleum was first discovered in the United States; for a long time Pennsylvania was the leading state in the production of petroleum, but it is now exceeded by Ohio. Natural gas is also found in large quantities in and about Pittsburg and neighboring localities. The state also contains many salt springs, but they have not yet been developed. Feldspar, flint, glass sand, graphite and talc are also found in considerable quantities.

AGRICULTURE. The valleys between the mountains and the lower slopes of the hills and plateaus contain a fertile soil. This, with an abundant rainfall and a genial climate, well adapts the state to various lines of agriculture. In general, farming is widely diversified, and no one industry leads. The chief crops are rye, in which the state takes first rank in the Union, corn, oats, wheat, buckwheat, potatoes and hay. Large quantities of tobacco are raised, and in some regions the maintenance of nurseries is an important industry. The hillsides and mountainous regions are well adapted to grazing, and dairying is one of the most valuable branches of agriculture within the state. Large numbers of cattle, horses, sheep and swine are also raised for market. Dairy and poultry products are of considerable importance.

MANUFACTURES. Next to mining, manufacturing is the chief industry of Pennsylvania. The state ranks second in the Union in the value of its manufactures, which are chiefly of iron and steel. In iron products, Pennsylvania yields as much as all the other states combined. The first blast furnace was opened by William Penn in 1688. The manufacture of Bessemer steel was begun in 1867. The state now ranks first in the production of pig iron and of Bessemer steel. The manufactures of textiles rank second among the industries of the state. Philadelphia is the greatest textile center in the country and makes more ingrain carpets than any other city. The industry third in rank is the manufacture of foundry and machine shop products. The state ranks first in the Union in the

Pennsylvania

refining of petroleum and in the manufacture of steam locomotives, of coke and of glass products. For more than a hundred years Pennsylvania has stood at the head of glass-making states. Other important industries are leather tanning, car building, printing and publishing, the making of tobacco products, malt liquors, men's and women's clothing, flour and grist mill products, lumber and planing mill products. An industry of growing importance, and one in which the state takes foremost rank, is the building of iron and steel ships.

TRANSPORTATION AND COMMERCE. In the early history of the state a number of canals were constructed, leading from the interior to the Delaware and Potomac rivers, but since the building of railways most of these have been abandoned, though a few are still in use for the transportation of coal. The state is threaded by railway lines extending in all directions, and it is exceeded in mileage only by Illinois and Texas, now having about 11,250 miles of road. Some of the principal lines are the Pennsylvania, the Baltimore & Ohio, the Philadelphia & Reading, the New York Central & Hudson River, the Erie, the Lake Shore & Michigan Southern and the Lehigh Valley. Philadelphia and Pittsburgh are the chief railway centers. Many lines are projected into the mining regions and serve chiefly for the transportation of coal and ore, but all parts of the state are well provided with railway communication.

The commerce of the state is extensive. The exports consist chiefly of coal, iron and steel, manufactured products and building stone of various kinds, while the imports consist of manufactured goods and raw material, especially iron ore, which is smelted at Pittsburgh and other important iron manufacturing centers. A great deal of the commerce between the seaboard and the western and central states passes through Pennsylvania.

GOVERNMENT. The legislature consists of a senate of 50 members and a house of representatives whose number of members depends upon the population, apportionment being made after each Federal census. The senators are elected for four years, and the representatives for two. The legislature meets biennially, and the sessions are not limited as to time. The executive department consists of a governor, a lieutenant governor, a secretary of internal affairs, an auditor-general and a treasurer. The governor and lieutenant governor are elected for four years, the secretary of internal affairs

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and auditor-general, for three years, and the treasurer, for two years. Other executive officers, appointed by the governor and confirmed by the senate, are the attorney-general, the superintendent of public instruction and the secretary of the commonwealth, their terms being four years. The courts consist of a supreme court of seven judges, elected by the people for twenty-one years and not eligible for reelection; superior courts, which are held in the various judicial districts into which the state is divided; courts of common pleas and quarter sessions, besides local courts, established in towns and cities.

EDUCATION. The present system of education dates from 1834, when Pennsylvania established a system of free public schools. The schools are under the direct supervision of the superintendent of public instruction. Counties are divided into districts, each of which usually includes a township. The schools of the district are managed by boards of directors elected by the people, and these boards within the county elect a county superintendent. All cities have excellent systems of graded schools, but in some of the rural sections the schools are small and the minimum term is seven months. The state maintains thirteen normal schools, distributed among as many normal districts. The annual expenditure for public schools is over \$28,000,000, of which more than \$5,500,000 are appropriated out of the annual revenue of the state. The chief higher institutions of learning are the University of Pennsylvania at Philadelphia, Western University of Pennsylvania at Allegheny, Dickinson College at Carlisle, Lafayette College at Easton, Lehigh University at South Bethlehem, Haverford College at Haverford and Pennsylvania State College at State College, with which is affiliated the agricultural experiment station. The United States government maintains at Carlisle one of the leading schools for the instruction of Indians.

INSTITUTIONS. The state maintains two schools for the education of the deaf, two asylums for the blind and two for the feeble-minded. In addition to these a number of deaf and blind children are educated in private institutions which receive state aid. There is a soldiers' and sailors' home at Erie, and the hospitals for the insane are at Harrisburg, Danville, Norristown, Warren, Dixmont and Wernersville. The penal institutions comprise penitentiaries at Philadelphia and Pittsburgh (Allegheny), a workhouse in Allegheny County, a house of cor-

rection and a house of refuge at Philadelphia, a reform school at Morganza and an industrial reformatory at Huntington.

CITIES. The chief cities are Harrisburg, the capital; Philadelphia, Pittsburg (now including Allegheny), Scranton, Reading, Erie, Wilkes-barre, Lancaster, Altoona, Johnstown, Allentown, McKeesport, Chester, York and Williamsport, each of which is described under its title.

HISTORY. The first permanent settlement in the State of Pennsylvania was made by the Swedes in 1643, near the present site of Chester. It was taken by the Dutch in 1655 and by the English in 1664. The whole territory was granted by Charles II to William Penn in 1681, and the following year the capital of his province, Philadelphia, was built. Penn organized an extremely liberal government and attracted to his colony many persons who had suffered persecution in the Old World. However, Pennsylvania became extremely disorderly and at several different times the colony was taken from Penn, but was each time restored. During the French and Indian Wars, Pennsylvania refused to coöperate with the other colonies, but it suffered much through the raids of the indians and French, and at the close of the wars it erected a costly chain of forts on its frontier. The state was engaged in a long dispute with Connecticut over the Wyoming Valley, and in 1778 it witnessed the awful massacre at that place. Pennsylvania took an active part in the Revolution and organized a separate state government in 1776. Philadelphia was the seat of the Congress during the war, and important military events also took place within the borders of the state. The Federal Constitution was adopted at Philadelphia in December, 1787. During the slavery controversy, Pennsylvania was a loyal Union state and furnished many troops for the Federal armies. The state was three times invaded, the last time by Lee's army, which was defeated at Gettysburg. The recent events of interest were the Centennial Exposition (1876), the Johnstown flood (1889), the Homestead strike (1892) and the anthracite coal strike (1902). Since the war the state has been almost invariably a Republican stronghold, but has twice elected a Democratic governor. Consult Fisher's *Making of Pennsylvania*.

Pennsylvania, UNIVERSITY OF, an institution of higher learning, located in Philadelphia and established in 1740 as a charitable school. In 1755 it was raised to the rank of a college,

and in 1791, by act of the legislature, it was made the University of Pennsylvania. It maintains the following departments: the college, which includes the art school, courses for teachers and the Towne Scientific School; the department of philosophy, which includes the graduate school; the departments of law, medicine, dentistry, veterinary medicine and archaeology; the Wistar Institute of Anatomy and Physiology; the department of physical education, and the Flower Astronomical Observatory. The university has provision for a large number of scholarships and fellowships, whose incomes range from \$200 to \$800. The medical school has achieved an international reputation. The faculty numbers over 500 and the enrollment is over 5300. The library contains 380,000 volumes.

Penny, a small English coin and money of account. The coin is of bronze, weighs 145.833 troy grains and is worth, intrinsically, about one-fourth of its face value. It is equivalent to 4 farthings, one-twelfth of one shilling and one two-hundred-fortieth of a pound sterling. It is equal to 2 cents in United States money. Its abbreviation is *d.*, having been derived from its similarity to the Roman coin *denarius*. A similar name, the *pfennig*, is given to the German coin, originally of silver, worth one two-hundred-fortieth of a German pound of silver. It is now made of nickel and is equivalent to one one-hundredth of a *mark*, or about one quarter of a cent.

Penob'scot, a river of the United States, the largest in the State of Maine. It rises in Somerset County, near the Canadian boundary, runs southeastward, then south and finally flows into Penobscot Bay. Its total course is about 350 miles, and it is navigable for large ships to Bangor, 60 miles from its mouth. The river is of great use in transporting the supplies of timber which are cut on its banks.

Pen'saco'la, FLA., the county-seat of Escambia co., 48 mi. e. of Mobile, Ala., on the Pensacola Bay, 6 mi. from the Gulf of Mexico, and on the Louisville & Nashville and the Pensacola, Alabama & Tennessee railroads. It has an excellent harbor, with forts Pickens, Barrancas and McRee at the entrance, and is the most important city of western Florida. There is a large trade in lumber, fish, naval stores, cotton and coal. A United States navy yard is located here. The city has public parks of considerable beauty, and the remains of the old Spanish forts, San Bernardo and San

Miguel, are also of interest. The important buildings are the state armory, the Federal building, the courthouse, an opera house and public school buildings. Pensacola was first permanently settled by the Spaniards in 1696. It was captured by the French in 1719, but was restored to the Spaniards four years later. The British took possession in 1763, but the place was captured by the Spaniards in 1781. General Jackson occupied the city during the War of 1812. The United States secured permanent possession in 1821, in accordance with the treaty of 1819, and the navy yard was soon after established. The city suffered considerably from a fire in 1864, but it soon recovered. Population in 1910, 22,982.

Pension, *pen'shun*, an annual allowance of money settled upon a person, usually for services previously rendered. The pension system of the United States presents two peculiar features, namely, the almost entire absence of a civil list and the non-recognition of long service as a ground for pension. Generally speaking, pensions are granted only for active service in time of war, and, therefore, the beneficiaries are the survivors (or their widows and children) of the armies of volunteers and conscripts who took part in the country's wars. The last surviving child of a Revolutionary soldier died in 1911. On June 30, 1912, the list of pensioners, besides those arising out of the Civil War, was as follows: War of 1812, widows, 226; Indian wars, survivors, 1210, widows, 2439; Mexican War, survivors, 1313, widows, 5533; Spanish-American War, survivors, 28,850; widows, 25,000.

But the great part of the United States pensions are "invalid pensions," for those totally or partially disabled from wounds or disease contracted during the Civil War; the widows and children under sixteen years of age of those who have died from wounds or disease; or, in the event of no widows or minor children surviving, then the dependent parents, or minor brothers and sisters, of officers or men who have so died. The pensions, which range from \$24 to \$2000 per annum, are graded according to the degree of disability or dependence. Thus, where the aid and attendance of others is required, from \$50 to \$72 a month is paid; where the beneficiary is incapacitated for manual labor, \$30 a month; for the loss of a hand or foot, or total deafness, \$30; of both feet or hands, or both eyes, \$72 a month, and for amputation at the shoulder or hip joint, \$45. Widows or dependent relatives of privates

receive \$12 a month; children, \$2 each, but if the widow does not survive, they receive their pensions jointly. Widows or dependent relatives of officers receive from \$15 to \$30 a month. The pensions of widows cease when they marry.

For the administration of the pension system, an independent bureau was created in 1833; since 1849 it has been a bureau of the department of the interior. The following figures show the enormous growth of the American pension system: In 1862 the disbursements slightly exceeded \$790,000; in 1872 they exceeded \$30,000,000; in 1882, \$54,000,000; in the year ending June 30, 1890, \$109,357,534, or nearly one-fourth the entire revenue of the nation. In 1907, 1908 and 1912 pension laws were passed which vastly increased the rolls. There were 860,294 pensioners on the rolls in June, 1912, and the total disbursements in that year were \$152,986,433. The total number of applications filed since 1865 is 3,289,090, of which 2,078,340 have been granted. The total cost of the pension bureau since its organization has been \$4,383,368,163. The cost per capita of the population in 1912 was about \$1.68. By a law of 1912, special pensions were provided for all veterans over 62 years old. The minimum pension under this law is \$13 a month, granted to those who served only 90 days; the maximum is \$30 a month, for survivors over 75 years old who served two years or over.

It may be added that by an act of 1882, children of keepers or crew of a life-saving or life-boat station who perish in, or from injuries received through, the life-saving service, are given the full pay of the deceased for two years. Federal judges and some other civil officers may be retired at a certain age, some of them on full pay. Army and naval officers are retired at a specified age on half pay.

Pentateuch, *pen'ta tuke*, the name given to the first five books of the Old Testament, *Genesis*, *Exodus*, *Leviticus*, *Numbers* and *Deuteronomy*, when regarded as a whole. By the Jews these were known as the Books of the Law. Some modern authorities consider that the book of *Joshua* should be added. Most biblical scholars believe the books of the Pentateuch to have been written by Moses, but some dissent from this opinion and consider portions of them to have been written after Moses died.

Pen'tecost, a Jewish festival, held on the fiftieth day after the Passover, in celebration of the ingathering of, and in thanksgiving for, the harvest. It was also called the *Feast of Weeks*, because it

was celebrated seven weeks after the Passover. In the Christian Church it occurs fifty days after Easter, and commemorates the descent of the Holy Ghost on the disciples. In England it is called Whitsuntide, or Whit-Sunday, because of the white robes worn by the newly baptized.

Penum'bra, the partial shadow between the full light and the total shadow. The light shading in Fig. 2 in the article ECLIPSE shows the penumbra. An eye placed in the penumbra would see part of the luminous body; an eye placed in the *umbra*, or total shadow, would receive no rays from the luminous body; an eye placed anywhere else than in the penumbra and umbra sees the luminous body without eclipse. In a partial eclipse of the sun, as long as any part of the same is visible, the persons observing are in the penumbra; when the eclipse is total, in the umbra.

Pe'ony, a plant belonging to the crowfoot family. It is a native of Europe and Asia and is very generally cultivated in gardens, for the sake of the large, showy flowers, which are solitary and of a variety of colors, crimson, purplish, pink, yellow and white. Excepting one shrubby species, a native of China, of which several varieties, with beautiful whitish flowers, stained with pink, are cultivated in gardens, the peonies are odorless or have a disagreeable odor. The common peony was once in great repute as a medicine.

People's Party. See POPULIST PARTY.

Peo'ria, ILL., the county-seat of Peoria co., 160 mi. s. w. of Chicago, on the Illinois River and on the Chicago, Burlington & Quincy, the Illinois Central, the Chicago & Northwestern, the Chicago, Rock Island & Pacific, the Lake Erie & Western and several other railroads. The city is built along the river at the outlet of the expanse known as Peoria Lake. The business section lies near the water, while the residences are chiefly on the bluff. The educational institutions include the Bradley Polytechnic Institute, Spalding Institute, Sacred Heart Academy and a good high school, connected with the public school system. The city has a large public library, and law and high school libraries. Some of the charitable institutions are the Saint Francis Hospital, the Saint Joseph Home for the Aged, the House of the Good Shepherd and an orphanage. Other important buildings are the courthouse, the city hall, the Federal building, a cathedral, the Y. M. C. A. and the Coliseum, which seats about 6000 people.

As an industrial center, the place is very important. It contains large agricultural imple-

ment works, extensive distilleries, glucose works and a large variety of other establishments, including foundries, machine shops, printing houses, strawboard works, packing houses, cooper shops, flour and lumber mills, wagon works and other factories. There is also a large trade in grain and live stock.

The place where Peoria now stands was visited by La Salle about 1680, and Fort Crevecoeur was then erected. The French settled here about 1778, but they were suspected of inciting the indians against the Americans and were driven away by the United States soldiers about 1812. Seven years later the first permanent settlement was made, and this was incorporated as a town in 1835 and was chartered as a city ten years later. In 1900 North Peoria was annexed, and this increased the population about 3000. Population in 1910, 66,950.

Pep'in or Pip'pin, the name of two distinguished Frankish rulers of the eighth century, under the last kings of the Merovingian dynasty. 1. PIPPIN OF HERISTAL (?-714), major-domo at the court of Dagobert II, was, after the death of the king, appointed duke of the Franks, and under a feeble regency he ruled the kingdom with almost despotic sway. Charles Martel was his natural son. 2. PIPPIN THE SHORT (714-768), son of Charles Martel, was, by agreement with the pope, proclaimed king of the Franks in 752, after the deposition of Childerich. He was induced by the pope to undertake several campaigns against the Lombards, and the land which he took from that people he gave to the pope. Charles the Great was his son.

Pep'per, a genus of plants which furnishes the black pepper of commerce, a native of the East Indies, where it is cultivated on an extensive scale. It is a climbing plant, with large, broad leaves, very small flowers and little globular berries, which, when ripe, are of a bright red color. The pepper of Malacca, Java and, especially, Sumatra, is best. White pepper is the best of the berries, gathered when fully ripe and deprived of their external skin. It is an interesting fact that pepper was the most important article of trade with the East until cotton, sugar and coffee became known, and was one of the costliest spices until the fourteenth century. Red pepper is obtained from the pods of the capsicum (See CAPSICUM). (See illustration on next page.)

Peppermint, a perennial herb, belonging to the order *labiatae*. It is easily distinguished from other kinds of mint by the leafy stalks and by the spike-like heads into which the flowers

Pepsin

are grouped. The oil of the plant has a sharp, pleasant odor and taste, and is used extensively for flavoring candy. It is also used in the prepa-



ration of drugs having a disagreeable taste. Michigan raises nearly one-half of the world's supply.

Pep'sin, a substance found in the gastric juice. Its nature is little known, but it has the power to digest proteids, changing them into peptones, resembling in this the trypsin of the pancreas, which, however, acts in an alkaline medium. Pepsin differs from ptyalin, the ferment of saliva, by its being active in a definitely acid medium, while ptyalin acts more freely in one slightly alkaline.

As employed in medicine for digestive purposes, pepsin is usually obtained from the stomach of the pig or calf, by the drying of the fresh mucous lining of the stomach at a temperature below 100° F. That prepared from the stomach of the pig, and known in medicine as *pepsina porci*, is preferred. See PEPTONES; PROTEIDS.

Pep'tones, a class of proteid substances, produced during digestion by the action of the pepsin of the gastric juice upon the nitrogenous elements of the masticated food in the stomach. The production of peptones is the main function of the digestion of the stomach.

Perception

The main features of peptones, distinct from other proteids, are their ready diffusibility and their solubility in water and in neutral saline solutions. The white of egg, for instance, as soon as it is acted on by the gastric juice, is easily soluble, and passes in solution through the membranous lining of the stomach into the system of surrounding blood vessels.

Pepys, *peps*, *peeps* or *pep'is*, SAMUEL (1633-1703), a famous English diarist, whose *Diary* gives a detailed and invaluable account of court life in England during the years from 1660 to 1668. This was deciphered from the shorthand notes in which it was written and was first published in 1825. It has gone through numerous editions and remains very popular, being written in a fresh, breezy style and containing a great store of interesting and amusing anecdote.

Pe'quot, a warlike tribe of New England indians, which was practically exterminated in a bloody war with the white settlers in 1637.

Perception, *per sep'shun*, the mental power by which we interpret impressions received through the senses. Sensations grow into perceptions, and the relation between sensation and perception is so close that we cannot find a clear line of separation between them. Perception is a complex act, including sensation and all the other mental powers. When one becomes conscious of a sensation, he immediately gives his attention to it. This involves an act of will. The idea received is then compared with other ideas in the mind, calling into play memory, which brings these ideas into consciousness, the thought power, used in the process of comparison, and the judgment, used in deciding whether the new idea agrees or disagrees with the old.

The ideas obtained by perception form the earliest content of the child's mind. These ideas become more complex and elaborate as the powers of observation develop, and before a complete idea of any object is obtained, a number of observations are necessary. Since each sense gives knowledge of qualities that cannot be obtained through any other, it is also necessary that all the senses possible be brought to bear upon an object in order that a complete idea of it may be obtained. Ideas obtained through the senses of sight and touch alone are incomplete and often misleading. As ideas are apprehended, they are compared with the ideas in the mind and classified. See APPERCEPTION; CONCEPT.

REALIZATION OF SELF. Perception is not only an isolating process, singling out the idea to which

attention is given from numerous sensations clamoring for recognition, but it is also one in which the child identifies himself as something distinct from the object perceived. He does not recognize the image of the apple formed upon the retina, but the apple itself; neither does he recognize the vibrations of his mother's voice while singing a lullaby, but the tones which he locates at their source. This realization of the self is slow and difficult, and is only fully developed with the perfection of the organs of sense.

TRANSFERRED PERCEPTIONS. We soon learn to use perceptions acquired through one sense in interpreting those received through another, as the recognition of a friend by his voice or his step. Ability to do this saves much in the way of time and energy. Were it not for the power to transfer perceptions, we should not know by looking at a glowing iron that it is hot, or at ice, that it is cold. This is no more nor less than saying that we use our experience in furthering our acquisition of knowledge.

CULTIVATION OF PERCEPTION. The power of perception is one of the earliest powers developed and is synonymous with the power of observation. The child can be greatly assisted in developing this power, if parents and teachers will adhere to a few simple principles. These are:

(1) The cultivation of perception is coincident with training of the senses. This training should receive careful attention during childhood and youth, the periods in which these powers are the most active.

(2) Attention is essential to perception, and attention depends upon interest. If the child is brought in contact with his surroundings in such a manner as to have them appeal to his curiosity, he readily gives attention to those things that interest him and gains ideas for himself. See ATTENTION; INTEREST.

(3) Only a very small part of a sensation is perceived at one time; hence, complete perception requires frequent repetition.

(4) Complex ideas are perceived gradually, only a part of the idea being retained with each impression. As the proper relations become established, the idea develops in the mind and finally assumes its true relation. To attempt to force this development or to expect the immediate perception of complex ideas by children leads to memorizing facts which have no meaning, and dwarfs the reason.

(5) Clear ideas are obtained only by careful observation of simple things or acts. Too many

objects, the attempt to grasp too many things at once, or the use, with young children, of objects which are complex, tends to the confusion of ideas.

(6) Illusions often arise from prepossessed ideas. One thinks he sees what he expects to see, as more than half of an orange, the back side of a cube, when impartial observation shows that this is impossible.

(7) Right preparation of the mind is a great aid to perception. The skilful teacher prepares her pupils to receive the new ideas which she is to present by carefully leading up to these in such a manner as to cause the pupils to anticipate what the new lesson contains.

(8) Observation means careful, systematic looking at things. While some possess this power to a greater extent than others, it is perfected only by training.

(9) The perceptive powers should be so trained as to make them first accurate, then quick. Pupils whose powers of observation have been thus trained during the first years of their school life will readily appreciate the beauties of nature, literature, music and art.

Consult Halleck's *Education of the Central Nervous System and Psychology and Psychic Culture*; Baldwin's *Mental Development* and Salisbury's *The Theory of Teaching*.

Perch, *purch*, a large family of fresh-water fishes, containing nearly 100 species, which are found in both America and Europe. The best-known species is the *river*, or *yellow perch*, common in the streams and lakes from New England and New York to the upper Mississippi valley. It is a small fish, seldom exceeding a pound in weight, and is easily caught by hook and line. Its flesh is highly esteemed, but the fish is not considered as valuable as numerous other species, because of its large number of bones.

Percussion, *pur kush'un*, in medicine, a means of determining the comparative density of different portions of the body, by tapping upon them. This method is used especially in detecting diseases of the chest and vital organs. Originally the only method employed was to tap directly upon the body, and this did not produce the satisfactory results that are now achieved by what is called the *mediate* method. In this, the stroke is not made upon the body itself, but upon a finger with its flat surface accurately fitted to the naked body, or upon some specially prepared instrument of wood, ivory or gutta-percha. Sometimes a small hammer is used in

percussion. Physicians learn to recognize any departure from normal sounds, either in the chest or in the abdominal regions, and so are able to locate many times very accurately the source and extent of disease.

Perfectionists, *pur fɛk'shun ists*, or **Bible Communists** (popularly named *Free-lovers*), an American sect, founded in 1838 by John Humphrey Noyes. Noyes was employed as a law clerk at Putney, in Vermont, when the fierce religious revival of 1831 spread over the New England states. He gave up law for religion and soon began to teach and to preach the forming of a community where all things should be held in common, beginning with the members of his own family. The opposition in Putney to his doctrines concerning marriage broke up the community in 1847, and Noyes and his followers went to Oneida, N. Y. Here "mutual criticism" was made a form of government and a method of cure in illness. In 1879 the property of the community was valued at \$600,000. They engaged in making traps, in fruit preserving, in agriculture and in the manufacture of silk thread. There was a branch community at Wallingford, Conn. Through the influence of the churches, in 1879 the community was dissolved.

Perfumes, *pur'fume'z*, substances emitting an agreeable odor, used about the person, the dress or the dwelling. Perfumes of various sorts have been held in high estimation from the most ancient times. They are partly of animal, but chiefly of vegetable, origin, and may be divided into two classes, *crude* and *prepared*. The former consist of such animal perfumes as musk, civet, ambergris and such vegetable perfumes as are obtained in the form of essential oils. The prepared perfumes, many of them known by fancy names, consist of various mixtures or preparations of odorous substances, made up according to recipe.

At the present time the manufacture of perfumes is chiefly carried on in Paris and London and in various towns near the Mediterranean, especially in the south of France. Certain districts are famous for certain productions; as Cannes, for its perfumes of the rose, tuberose, cassia and jasmine; Nîmes, for thyme, rosemary and lavender; Nice, for the violet and mignonette. England claims superiority for her lavender, which is cultivated upon a large scale at Mitcham, in Surrey. The most expensive perfume in the market at present is the oil of rose petals, or attar of roses. In making this perfume, the blossoms are taken from a bushy variety of the

damask rose and from the white musk rose. These roses are gathered in the latter part of May and as soon as picked are taken to the distillery and placed in large, cool cellars. About 25 pounds of fragrant blossoms are put into a tinned copper still, water is added and a fire is started in the miniature furnace underneath. When about one-fifth of the contents has been drawn over through a water-cooled worm, the still is emptied and recharged, and the process is repeated until all the harvest of roses has been used. The first product is simply rose water. This rose water is returned to the still, and about one-third of its bulk of second rose water is drawn over. Throughout this liquid, there are scattered little globules of a precious, fragrant, oily attar. The distilled water is now put into bottles, and the oil gradually comes to the top and is dipped out with a spoon. This attar is worth about \$50 to \$100 an ounce.

Nearly all the ordinary perfumes are made by a process known as *enfleurage*. This consists in placing freshly gathered flowers in a glass case, the lid of which has been daubed with lard to the depth of half an inch. In the course of a day the lard absorbs all the essential oils in the flowers, and they are replaced by fresh ones. When fully charged, the lard is scraped off, melted and combined with alcohol, which brings the volatile oil to the surface. It is then skimmed off and filtered and is ready to be bottled and shipped. The waste leaves from the process are used as fertilizers.

Pericardium, *THE*, the closed membranous sac that envelops the heart. It is attached by its broad lower part to the upper surface of the diaphragm and is composed of two layers, an *external* one, made up of closely interlacing fibers, which at the upper end mingles its fibers with the external coats of the large blood vessels; and an *internal* serous layer, which lines the fibrous layer and also completely covers the heart. These two parts are continuous for a short distance along the great blood vessels at the base of the heart and thus form a closed sac. The bag so made contains enough fluid to prevent friction during the movements of the heart. In some diseases, especially in rheumatic fever, the pericardium becomes inflamed, and the surfaces become so rough that the friction produces a sound that can be heard.

Pericles, *per'i kleez*, (495?-429 B. C.), one of the most celebrated statesmen of Athens. He was connected by family relations with the aristocracy, but as Cimon was already at its head Pericles

endeavored to gain the favor of the popular party. In this he fully succeeded, by his eloquence, abilities and political tactics, so that on the death of Cimon, in 449 B. C., Pericles became virtual ruler of Athens. By his great public works he flattered the vanity of the Athenians, while he beautified the city and employed many laborers and artists. His chief aim was to make Athens undoubtedly the first power in Greece, as well as the chief center of art and literature, and this position she attained and held for a number of years. At the commencement of the Peloponnesian War, in which Athens had to contend against Sparta and other states, Pericles was made commander in chief. The Spartans advanced into Attica, but Pericles had made the rural population take refuge in Athens, and he refused battle. After they retired he led an army into Megaris, and next year he commanded a powerful fleet sent against the Peloponnesus. In 430 B. C. a plague broke out at Athens, and for a brief period Pericles lost his popularity and was deprived of the command. The people, however, soon recalled him to the head of the State. Many of his friends and his two sons were carried off by the plague; and to console him for this loss the Athenians allowed him to legitimize his son by Aspasia. Pericles himself died a few days later. His name is intimately connected with the highest glory of art, science and power in Athens. See ATHENS; GREECE, subhead *History*.

Perim, *pa reem'*, an island in the Strait of Bab-el-Mandeb, at the entrance to the Red Sea, about 2 mi. from the Arabian shore. It has been held by Great Britain since 1867 and is under the government of Aden. It has a garrison and a lighthouse.

Periodicals, publications which appear at regular intervals, and whose principal object is not only the conveyance of news, but the circulation of information of a literary, scientific, artistic or miscellaneous character. Periodicals exclusively devoted to criticism are generally called *reviews*, and those whose contents are of a miscellaneous and entertaining kind, *magazines*; but there is no great strictness in the use of the terms.

The first periodical was published in France in 1665 and was a magazine of literary criticism, the *Journal des Savants*. It still exists, at least in name. The most famous French literary periodical is the *Revue des Deux Mondes*, begun in 1829, from 1831 issued fortnightly, and marked by an ability which has placed it in the front rank of the world's periodicals. Into it tales, poems

and essays, are admitted, and the names of the contributors have to be attached to their articles.

The earliest English periodical was the *Mercurius Librarius*; or a *Faithful Account of All Books and Pamphlets*, begun in 1680. This was little more than a catalogue, and the first literary periodical of any importance was the *Weekly Memorials for the Ingenious*, which lasted but a year. It was followed by several other periodicals, which for the most part had but a brief existence. In the eighteenth century a number of monthly reviews and periodicals of more frequent publication appeared in England. A distinctive feature of some of these periodicals was the essay which appeared in each issue, and which was carried to a point of great excellence by Addison and Steele in *The Tatler* and *The Spectator*. Among the most important magazines established during the eighteenth century were the *Edinburgh Magazine*, the *Oxford Magazine*, the *Monthly Magazine* and the *Monthly Review*. Early in the nineteenth century was established the *Edinburgh Review*, which numbered among its contributors Scott, Carlyle, Hazlitt and Macaulay; a few years later the first number of *The Quarterly Review* appeared, and this was followed by the *Westminster Review* and the *Fortnightly Review*. Among magazines of the first half of the nineteenth century the most noteworthy were *Blackwood's Edinburgh Magazine*, *Fraser's Magazine* and *Bentley's Miscellany*; while of those established later may be mentioned *Macmillan's Magazine*, *The Cornhill Magazine*, *The Strand Magazine* and *The Pall Mall Magazine*.

The earliest periodical established in the United States was *The American Magazine*, first issued in 1741. Three days after the appearance of its first number, Benjamin Franklin put forth the first issue of his long-planned *General Magazine*. Periodical literature rapidly increased in the United States, emphasis being placed from the first on magazines, rather than on reviews. At the present time the most important magazines in the United States are *The Atlantic Monthly*, *Harper's Monthly Magazine*, *Scribner's Magazine*, *The Century Magazine*, *Lippincott's Magazine*, *McClure's Magazine*, *The Cosmopolitan*, *The American Magazine* and *Everybody's Magazine*. Of reviews the most noteworthy are *The North American Review*, the *Review of Reviews* and the *World's Work*.

Peripatetic School of Philosophy, the system of philosophy of Aristotle and his followers, so called, it is believed, because he was

accustomed to walk up and down with his more intimate disciples, while he expounded to them his doctrines. Practical philosophy is divided by Aristotle into ethics, economics and politics. According to his ethical system, the highest good is happiness, which depends on the rational or virtuous activity of the soul throughout life. Virtue is proficiency in willing what is conformed to reason. All virtues are either ethical or intellectual. The former include justice, or righteousness, generosity, temperance and bravery, the first being the highest. The intellectual virtues are reason, science, art and practical intelligence. For the attainment of the practical ends of life, it is necessary for a man to live in society and form a State.

The Peripatetic School continued at Athens uninterruptedly till the time of Augustus. Those who proceeded from it during the first two or three centuries after Aristotle's death abandoned, for the most part, the metaphysical side of his teaching and developed chiefly his ethical doctrines or devoted themselves to the study of natural history. No other one of the philosophical schools of antiquity maintained its influence so long as the Peripatetic. See ARISTOTLE; PHILOSOPHY.

Per'itone'um. See ABDOMEN.

Perjury, *pur'ju ry*, the act or crime of wilfully making a false statement under oath or affirmation, in judicial proceedings, in a matter material to the issue or cause in question. If a witness wilfully makes a statement about a matter of which he knows nothing, the act is sometimes accounted perjury. Perjury is a misdemeanor punishable by fine or imprisonment, or both. The testimony of one reliable witness, besides other corroborating evidence, is usually enough to convict.

Pernambuco, *per nam boo'ko*, a town in Brazil, capital of the State of Pernambuco, on the Atlantic coast. It consists of three distinct parts, Recife, the oldest part, occupying a small peninsula; Sao Antonio, on an island, and Boa Vista, on the mainland. Recife is the principal seat of business; Sao Antonio has most of the public buildings, and Boa Vista is the fashionable residence quarter. The harbor of the city is protected by a reef, which encloses a belt of water about a mile in breadth. Many of the buildings of the city are worthy of note. The trade is extensive. The principal exports are sugar, cotton, dyewoods, rum, alcohol and hides. The manufactures include cotton, machinery, glass and leather, but they are not yet of great

importance. Pernambuco is now the third largest city in Brazil and the second in point of commercial importance. It was founded by the Portuguese in the sixteenth century and from 1630 to 1654 was in the hands of the Dutch. Population in 1910, estimated at 150,000.

Peroxide of Hy'drogen. See HYDROGEN DIOXIDE.

Perpendic'ular, the name applied to the style of Gothic architecture common in England in the last half of the fifteenth and the first of the sixteenth century. The name is derived from the use of stiff and rectilinear lines, which were exhibited most clearly in the windows. The tracery was usually in straight lines, and horizontal bars crossed the mullions. Fan tracery was a peculiar feature of this style (See FAN TRACERY). The best specimens of this style of architecture are Henry VII's chapel at Westminster and colleges at Oxford and Cambridge.

Perpignan, *pair pe nyahN'*, a town of southern France, capital of the Department of Pyrénées-Orientales, on the Tet River, about 5 mi. from the Mediterranean. Guarding, as it does, the entrance from Spain into France by the East Pyrenees, it is strongly fortified by a citadel and other works and ranks as a fortress of the first class. The principal building is the cathedral, begun in the thirteenth century. The manufactures of the city include textiles, paper, chocolate, corks and furs. Perpignan was formerly the capital of the County of Roussillon and was not made a part of France until the Treaty of the Pyrenees, in 1659. Population in 1911, 39,510.

Perry, OKLA., the county-seat of Noble co., 30 mi. n. e. of Guthrie, on the Atchison, Topeka & Santa Fé railroad. The city has a valuable trade in grain, live stock and other produce with the surrounding agricultural region. The principal manufactures are flour, feed and cigars. A United States land office is located here, and there are several public parks. Population in 1910, 3133.

Perry, MATTHEW CALBRAITH (1794-1858), an American naval officer, brother of Oliver H. Perry. He was born at Newport, R. I., entered the navy at the age of fifteen and served during the War of 1812. After engaging for a time in mercantile service, he reentered the navy and was given command of unimportant expeditions against West Indian pirates. He was promoted to the rank of commander in 1826 and, in charge of the Brooklyn Navy Yard, superintended the construction of the *Fulton*, the first steam vessel

in the United States navy. He was placed in command of the vessel when it was completed and in 1841 was made commodore and was assigned to command of the fleet for the suppression of the African slave trade. He commanded for a time the American fleet in the Mexican War.



MATTHEW C. PERRY

In 1852 he accomplished his most notable service, in command of an expedition to Japan, where he succeeded in negotiating the treaty by which that country entered into commercial relations with other nations. He was the first American to circumnavigate the globe.

Perry, OLIVER HAZARD (1785-1819), an American naval officer, born at South Kingston, R. I. He is famous chiefly for his defeat of a British force on Lake Erie in 1813. Perry, who had nine vessels, with fifty-four guns and four hundred ninety officers and men, fought six vessels, with sixty-three guns and about four hundred sixty officers and men. He lost four-fifths of the crew of his flagship, but finally won a complete victory, which he announced in the brief dispatch, "We have met the enemy and they are ours—two ships, two brigs, one schooner and one sloop." As a reward for this victory he was given a gold medal and the rank of captain. He died of yellow fever in Trinidad and was buried there, but some years later his body was carried to Newport, R. I., where there is a bronze statue of him.

Per'ryville, BATTLE OF, a battle fought at Perryville, Ky., October 8, 1862, between a Federal force of 22,000, under General Buell, and a Confederate force of 17,000, under General Bragg. The Confederates opened the battle by an attack upon the left wing of the Federal army, under McCook, and were at first successful, but were finally driven back. They retired during the night. Though in many respects a drawn battle, this engagement was practically a victory for the Federals. The Confederate loss was about 3500, while the Federal loss was about 4200.

Persephone, *per sef'o ne*. See PROSERPINA.

Persepolis, a Persian city of great antiquity, famous for its magnificent ruins. It was situated in a fertile valley, about 30 mi. n. e. of Shiraz, was one of the capitals of Persia and is the burial place of many of the Persian monarchs. The remains of huge marble columns, vast portals, walls, bas-reliefs and sepulchers prove the former magnificence of its palaces and temples. The city became the capital of Persia under Darius I. It came into the hands of Alexander after the Battle of Gaugamela, in 331 B. C.

Perseus, *pur'se us*, an ancient Greek hero, son of Jupiter and Danæ. Danæ's father, Acrisius, king of Argos, had been told by the priests that he was to die at the hand of his grandson, and in an attempt to ward off this fate he shut his only daughter up in a tower, about which he set guards. Jupiter, however, seeing from Olympus the maiden's beauty and loneliness, made his way to her in a shower of gold and won her for his wife. When Acrisius was informed of the birth of Perseus, he was exceedingly angry, but, unwilling to have the boy put to death, he set Danæ and the child afloat on the sea in a cask. They floated safely to the island of Seriphos, and here they were taken ashore and treated kindly. As Perseus grew up, however, Danæ was much troubled by Polydectes, the king of Seriphos, who wished to marry her, and who, in order to be rid of Perseus, sent him on a quest to kill the Gorgon Medusa. Aided by Mercury, who lent to him his winged sandals, and by Minerva, who furnished him with a helmet which made him invisible and with her famous shield, Perseus succeeded in killing Medusa. After various adventures, chief of which were the rescue of Andromeda from a sea monster and the transformation of Atlas into a mountain, by showing him the Gorgon's head, Perseus arrived in Seriphos. Finding that his mother had been much persecuted by Poly-

detes during his absence, he revenged himself on the king by showing him the Gorgon's head, which turned him to stone. With his mother and his wife, Andromeda, he then returned to Argos. One day, while engaged in a game of quoits, he accidentally killed his grandfather, thus fulfilling the early prophecy.

Persia, *pur'sha* or *pur'zha*, a kingdom of southwestern Asia, called *Iran* by the inhabitants. It is bounded on the n. by Transcaucasian Russia, the Caspian Sea and Russian Turkestan; on the e. by Afghanistan and Baluchistan; on the s. by the Indian Ocean and the Persian Gulf, and on the w. by Asiatic Turkey and the Persian Gulf. Its greatest length, from northwest to southeast, is 1400 mi., and its area is about 628,000 sq. mi. The population is over 9,000,000.

SURFACE AND DRAINAGE. Persia may be considered as an elevated plateau, broken by clusters of hills or chains of rocky mountains, which alternate with extensive plains and barren deserts. Low tracts exist on the Persian Gulf and the Caspian. The interior plains have an elevation of from 2000 to 6000 feet above the sea. This vast central plateau is supported in the north and south by two great mountain chains or systems, and from these all the minor ranges seem to spring. The northern chain, an extension of the Hindu Kush, enters Persia from northern Afghanistan and reaches its greatest elevation on the south of the Caspian, where it takes the name of the Elburz Mountains and attains, in Mount Demavend, a height of about 18,500 feet. The other great mountain system runs from northwest to southeast nearer the Persian Gulf, is of considerable width and forms several separate ranges. The rivers are few and insignificant. Not one of them is of any navigable importance except the Euphrates, which waters only a small portion of the southwest frontier, and the Karun, recently opened to the navigation of the world. There are a great number of small fresh-water lakes, and a few very extensive salt lakes, the largest being Urumiah, in the extreme northwest.

CLIMATE. The climate varies considerably in different provinces, and in the central plateau intense summer heat alternates with extreme cold in winter. The shores of the Persian Gulf are scorched in summer; those of the Caspian Sea, especially the parts covered with dense forest, are humid and are noted for malaria.

MINERAL RESOURCES. The mineral wealth of Persia is but little developed. Iron, copper, lead and antimony are abundant, sulphur, naph-

tha and rock salt are found, and coal also exists. The turquoise mines of Nishapur are the only mines receiving anything like adequate attention.

INDUSTRIES. In the level and rich plains, the sugar cane and orange come to perfection; the pomegranate grows wild; the cotton plant and mulberry are extensively and successfully cultivated, and large tracts are occupied by the vine and by orchards producing every kind of European fruit. In the low plains, the only grain under extensive and regular culture is rice; the principal subsidiary crops are cotton, indigo, opium, sugar, madder and tobacco. Excellent dates are produced on the southern coast tracts. Irrigation is well understood and extensively practiced.

Animal products constitute a large part of the wealth of Persia. The domestic animals are sheep; goats, some of which produce a wool little inferior to that of Cashmere; asses and mules of a large and superior description; horses of Arab, Turkoman and Persian breeds, and camels. The manufactures of Persia were once celebrated, but excepting some carpets and shawls, it may be said that the country has ceased to export manufactured articles. Its chief exports now are rice, dried fruits, opium, silk, wool, cotton, hides, pearls and turquoises.

TRANSPORTATION AND COMMUNICATION. The internal trade of the country is almost entirely carried on by caravans. In 1888 the first Persian railway was opened, connecting the Caspian with Teheran. A projected railway includes a line from Resht to Teheran, with ultimate extension to the Persian Gulf. There are about 6400 miles of telephone lines in operation.

INHABITANTS. The population is chiefly made up of Iranians, or pure Persians, and Turanians (Turkish and Tartar tribes). Education is comparatively well attended to, Persia being considered, next to China, the best educated country in Asia. All wealthy families employ tutors for their children.

GOVERNMENT. The government of Persia is an absolute monarchy. The only control to which its ruler, the shah, is subject is the precepts of the Koran. He surrounds himself with a certain number of advisers, forming a ministry. These ministers he calls and dismisses at pleasure. By far the greater number of the inhabitants are Mohammedans.

CITIES. The chief cities are Teheran, the capital; Tabriz, Ispahan, Meshed, Kerman, Yezd and Resht.

HISTORY. The Persians are descended from

Aryan stock, and from the most ancient times of which we have any record they have inhabited the southwestern part of the plateau of Iran, anciently known as Persis. In the ninth century B. C. they were first conquered by the Assyrians and forced to pay tribute. In 660 B. C., when the Assyrians were overcome by the Medes, the allegiance of Persia was transferred to Media.

About 550 B. C. Cyrus the Great conquered the king of Media, and Persia became the mistress, instead of the vassal, of Media. From this time on, the Medes and Persians are spoken of as one people. Cyrus continued his conquests and built up an empire which extended from the Oxus and Indus to the Mediterranean. He was succeeded by his son, Cambyses II (529-522 B. C.), who subdued Tyre, Cyprus and Egypt. Darius I, who ascended the throne in 521 B. C., organized the kingdom and divided it into twenty states, each governed by a satrap, who was appointed by the king. The capital of the Empire was fixed at Susa. The Grecian colonies in Asia Minor had fallen into the hands of Cyrus, and it was Darius's plan to subjugate Greece herself (See GREECE, subhead *History*). To this end he sent two great expeditions against Greece, but they were both fruitless, the second ending in his defeat at the famous Battle of Marathon (490 B. C.). Darius died in 486 B. C. and was succeeded by his son, Xerxes I, who carried on his father's plans against Greece. Assembling over a million soldiers, he marched at their head to the Hellespont. At the pass of Thermopylae his march was checked by the Spartan Leonidas, with seven thousand Greeks. Leonidas and all his men fell at the hands of the Persians, and Xerxes advanced successfully to the plains of Greece. Nothing but defeat awaited him there, and the battles of Salamis, Plataea and Mycale banished all hopes of Persian supremacy in Greece.

Persian history during the next century is a record of internal strife. The most noteworthy event was the attempt of Cyrus the Younger (401 B. C.) to seize the throne of his brother Artaxerxes. Finally, in 330 B. C., the Empire fell before Alexander the Great. After his death, Persia passed successively into the hands of the Seleucidae, the Sassanians, the Arabs and the Seljuks. The dynasty of the Seljuks was swept away by the Mongols under Genghis Khan, in 1223 A. D. His grandson Hulagu Khan founded the Perso-Mongol dynasty, which, in 1380, gave way before Timur (Tamerlane) the Tartar.

After Tamur's death the Turkomans were masters of the country for one hundred years.

In 1500 Ismail Safi, who pretended to be descended from Ali, the son-in-law of Mohammed, at the head of a force of Turkish tribes overthrew the Turkomans and made himself ruler of Persia, assuming the title of shah. Shah Ismail and his descendants were constantly obliged to protect Persia from the sultan of Turkey. In 1795 Agha Mohammed, a Turkoman, founded the present dynasty of Persian rulers. In 1797 Agha was succeeded by his nephew, Futeh Ali, who, soon after his accession, became involved in a war with Russia. By the Treaty of Gulistan (1813), Persia ceded several provinces to Russia and granted her the right of navigation in the Caspian Sea. In 1826 another Russian war broke out. Persia was again defeated and was compelled to cede Armenia to Russia. Futeh Ali died in 1834 and was succeeded by his grandson Mehemet Shah, during whose reign the country grew constantly weaker and came more and more under Russian influence. When, at Mehemet's death in 1848, Nasr-ed-Din came to the throne, he found the country in confusion; but he established himself firmly and planned a policy of expansion. Against the Turkomans and several neighboring tribes he was successful, and he asserted the claims of Persia in Afghanistan and Baluchistan. The English government objected to this expansion of territory and compelled him to sign an agreement not to interfere in the affairs of these countries, putting a stop to whatever thoughts of further conquest he may have entertained. In 1896 he was fatally shot by a religious fanatic and was succeeded by his son Muzaffar-ed-Din. Muzaffar-ed-Din did away with the office of grand vizier and, assuming control of his cabinet of twelve ministers, at once proposed energetic reforms, some of which were carried out. The taxes on foods were reduced, the civil service was reformed, and revolts and conspiracies were sternly repressed. Muzaffar-ed-Din was succeeded in 1907 by Mohammed Ali Mirza.

Persian Gulf, a gulf separating Persia from Arabia and communicating with the Arabian Sea by the Strait of Ormuz. Its greatest length is 520 miles, its average breadth, about 180. It receives the waters of the united Tigris and Euphrates and of a number of small streams. There are many islands in the gulf, the largest of which are Kishm, Ormazd and the Bahrein islands. In the neighborhood of the latter there are important pearl fisheries.

Persian Wars. See GREECE, subhead *History*; PERSIA, subhead *History*.

Persian Wheel or **Noria**, a machine for raising water for irrigation. It has been employed from time immemorial in Asia and Africa and was introduced by the Saracens into Spain and other European countries. It consists of a double water wheel, with float boards on one side and a series of buckets on the other, which are movable about an axis. The wheel is placed in a stream, the water turns it and the filled buckets ascend; when they reach the highest point, their lower ends strike against a fixed obstacle, and the water is discharged into a reservoir. In Portugal, Spain, southern France and Italy, this wheel is extensively used and has been modified to enable it to draw water from ponds and wells, animals supplying the motive power, and pots and leather or other bags taking the place of buckets. See IRRIGATION.

Persim'mon, the date plum of America, the fruit of a tree growing in the Southern states, where it attains the height of sixty feet or more. The fruit is succulent, reddish and about the size of a small plum, containing a few oval stones. It is powerfully puckery when green, but when fully ripe the pulp becomes soft, palatable and very sweet.

Personal Property or **Per'sonalty**, in general, in law, things movable or temporary, as money, jewels, furniture, distinguished from things fixed or immovable, which constitute *real property*, in a general sense, as estates in land and its fixtures. Specifically, in law, the only firm distinction between real and personal property is the disposition after death, the former being inheritable, the latter being at the disposal of the administrator. Title to personal property can usually be transferred by agreement of the parties. See CONTRACT; REAL PROPERTY.

Perspec'tive, the art or science which teaches how to represent objects on a flat surface so that they appear as though they themselves were viewed from a given point. Perspective is intimately connected with all art in general and is particularly important in the art of painting, as without correctness of perspective, no picture can be entirely satisfactory. That part of perspective which relates to the form of the objects differs essentially from that which teaches the gradation of colors according to the relative distance of objects. A person looking through a glass window at objects without, will perceive the shape, size and location of every object upon the glass. If the objects are near the window,

the spaces they occupy on the glass will be larger than those occupied by similar objects at a greater distance. If they are parallel to the window, their shapes upon the glass will be parallel, likewise; if they are oblique, their shapes will be oblique, and so on. As the person alters his position, the location of the objects upon the window will be altered, also. The horizontal line, or line corresponding with the horizon, will in every position of the eye be upon a level with it, that is, will seem to be raised as far above the ground upon which the spectator stands as his eye is. Now, if the person at the window draws with a pencil upon the glass, the figure of an object seen through it, as if the point of the pencil touched the object, he will have a true representation of the object in perspective as it appears to his eye. Representations of objects have, however, generally to be drawn on opaque planes, and for this purpose rules have been deduced from optics and geometry, and the application of these rules constitutes what is properly called the art of perspective. See DRAWING, Volume VI.

Perth, *purth*, the capital of Western Australia, situated on the Swan River, 12 mi. above its port, Freemantle. The chief buildings include a city hall, the governor's palace, a mechanics' institute and an observatory. The city also has barracks and a large park. The population of the city proper in 1901 was 27,553; in 1911, including suburbs, 35,767.

Perth Amboy, N. J., a city in Middlesex co., 15 mi. s. of Newark, on Raritan Bay, at the mouth of the Raritan River, and on the Central of New Jersey, the Lehigh Valley, the Pennsylvania and other railroads. It was settled by people from Scotland about 1683, on the site of an indian village called Amboy. They named the place Perth in honor of the Earl of Perth, and the indian name was added later. It was the capital of the Province of New Jersey up to the Revolution. There is an excellent harbor and considerable shipping, especially of coal. In the vicinity are deposits of fire clay, and the city has extensive shipbuilding yards, large smelting and refining plants, and brick, terra cotta and steel works, railroad shops and other factories. The municipality has a public library, the city hall park, a high school and three banks, and it owns and operates the waterworks. Population in 1910, 32,121.

Perturbations, *pur'tur ba'shunz*, the deviations of the planets from their regular elliptical orbits. These deviations arise, in the case of the primary planets, from the attraction of these

planets upon one another. In the secondary planets the cause is partly the mutual gravitation of the secondaries of the same system and partly from the unequal attraction of the sun on them and on their primary.

Peru', a republic of South America, lying between 3° 25' and 18° south latitude, and 70° and 81° 25' west longitude. It is bounded on the n. by Ecuador and Colombia; on the e. by Brazil and Bolivia; on the s. by Bolivia and Chile, and on the w. by the Pacific Ocean. Its length from north to south is about 1100 mi.; its greatest breadth, 800 mi., and its area, 695,700 sq. mi., or nearly two and one-half times the area of Texas.

SURFACE AND DRAINAGE. Two ranges of the Andes Mountains traverse the country from northwest to southeast and divide it into three physical regions. The first is the coast region, with an average breadth of 20 miles, which is mostly a desert. The second is the interior plateau and mountain region, generally known as the Sierra, consisting of a broad plateau, upon which the ranges and spurs of mountains rest. These are interspersed by high valleys and deep ravines. The loftiest summits are in the south, and many of them rise above the snow line, several attaining an elevation of 20,000 feet or more. While much of this region is cold and barren, in the main it is the home of the greater part of the population of the country. To the east of the mountains is the third region, known as the Montaña, a tropical region, well watered and densely wooded. This slopes from the foothills of the Andes to the low plains of Brazil and is by far the most fertile portion of the country.

The rivers of the coast region are short, rapid, unimportant and unsuited to navigation, but their water is used in irrigating the land adjoining their banks, and each river valley is clothed with abundant vegetation. The other streams rising in the valleys between the Andes or on the eastern slope take a northward direction and unite directly with the Amazon or with some of its tributaries. In the northern part of the country are the head waters of the Amazon, which is known as the Marañon until it is joined by the Ucayali, the great river of eastern Peru. Lake Titicaca, in the extreme southeast, lies partly in Peru and partly in Bolivia.

CLIMATE. Along the coast the climate is hot, dry and somewhat unhealthful, but in the uplands of the interior it is mild and salubrious, the temperature at Lima in summer ranging from 80° to 84° and in winter from 60° to 64°, while on the

eastern slope the temperature ranges from temperate to tropical, and the rainfall is heavy. The highest altitudes have a cold climate. The peculiarity of the rainfall is due to the fact that Peru lies in the path of the trade winds, which bring an abundance of moisture from the Atlantic. The eastern slope of the mountains robs the winds of most of this; however, some reaches the intervening valleys, while the western slope has scarcely any, the annual precipitation there being less than five inches.

MINERAL RESOURCES. The country is rich in minerals and, for a long time after it was discovered by the Spaniards, mining was the chief industry and the great source of wealth. Gold is quite generally distributed over the country. Copper is found along the coast, and there are large deposits of lead, bismuth and tin, but silver is the most important metal and is widely distributed, the chief mines being those of Cerro de Pasco. Coal measures are found in the central part of the country and have been worked to some extent; but on the whole, the mining industry is in a backward state, and only small returns are received from the labor and capital invested. This is largely due to the lack of transportation facilities.

AGRICULTURE. In the valleys and uplands the soil is highly fertile, and wherever sufficient moisture can be obtained abundant crops are raised. In the lowlands the chief crops are sugar cane, coffee and cotton, the first being considered the staple and affording the most valuable agricultural product for export. The cotton is specially valuable for mixing with wool, and in fineness and strength the fiber is second only to the sea-island cotton of the United States (See COTTON). In the higher lands grains common to the temperate regions are raised. Fruits also are cultivated, and the manufacture of wine is becoming an important industry. The eastern part of the country is covered with dense forests, and its most important exports are forest products, consisting of rubber, cinchona, dye stuffs, medicinal drugs and, in the cultivated portions, cocoa, which is raised in large quantities.

The manufacturing industries are few and of little importance. There are a few cotton factories in the larger towns; some clothing, furniture, boots and shoes, soap, lard, olive oil and cottonseed oil cake are manufactured. The indians are noted for their skill in the manufacture of straw hats, which are sold as Panama hats, though they are made of a different fiber from the Panama hats of Ecuador.

Peru

TRANSPORTATION AND COMMERCE. Callao is the principal seaport and is entered by steamers that ply regularly between South American and European ports and between South American ports and those of the United States. The country has over 1600 miles of railroad in operation. These lines connect interior towns with some seaports. They have but few branches and are separate from each other, so that the country lacks a railway system. A line connecting Lima and Oroya crosses the Andes at an elevation of 15,645 feet and forms a part of the great trans-Andean railway system. Carriage roads are few and poor, and most of the inland transportation is by pack animals, llamas being employed to a large extent. All products of the eastern part of the country are exported by way of the Amazon.

Sugar is the chief article of export, followed by minerals, then by cotton and rice. Other articles of considerable importance are leather, wool and coffee. The imports consist almost entirely of machinery and manufactured goods. The foreign trade is with the United Kingdom, Germany, the United States, France and Chile, the countries being named in the order of their importance.

GOVERNMENT AND RELIGION. The country is a republic, and its present constitution quite closely resembles that of the United States. The executive power is vested in a president, who, with two vice-presidents, is elected by popular vote for four years. The president is assisted by a cabinet of six ministers. The legislative power is vested in a Senate of 48 members and a Chamber of Deputies of 108 members, elected by popular suffrage and apportioned among the political divisions according to population. The senators are elected by provincial electoral colleges and serve six years. The Roman Catholic Church is the State Church, and the public exercise of any other religion is prohibited by the constitution; however, there are a few Protestant churches and mission schools in the country.

INHABITANTS. More than one-half of the inhabitants are indians. About one-fourth consist of races of mixed blood, which have arisen from the intermarrying of Europeans with indians or negroes with indians. The proportion of negroes is small, as is that of Chinese. Spanish is the language in general use.

EDUCATION. Free public schools are maintained by the municipalities, and theoretically attendance is compulsory, though the law is not strictly enforced. High schools are maintained

Peru

by the government in the capitals of the various departments, and the University of San Marcos has departments of law, literature, theology, medicine and political science. There are also small universities at Arequipa, Cuzco and Trujillo, and a school of mines and engineering is located at Lima.

CITIES. The chief cities are Lima, the capital; Callao, Arequipa and Cuzco, each of which is described under its title.

HISTORY. Peru was the center of a vast empire ruled by the Incas, who, previous to their conquest by the Spaniards, extended their sway over a large part of what is now Chile, Bolivia, Ecuador, Brazil and northern Argentina. Owing to internal dissensions, the Incas were easily conquered by the Spaniards early in the sixteenth century, and Peru became a Spanish colony. The early Spaniards abused the natives in a most cruel manner, until the sufferings of these unfortunate people caused the home government to take action in their behalf, when a more humane policy was instituted. During the sixteenth and seventeenth centuries, the colony of Peru, together with other South American colonies, was torn by dissensions between contending rulers and factions. In 1718 the Province of Quito was separated from Peru, and sixty years later a large portion of the southern territory was added to the government of Buenos Ayres. In 1816 Peru attempted to gain her independence, but was not successful. However, with the assistance of English volunteers and troops from Chile and other South American countries, she succeeded in 1821. From that time to 1883 the country was frequently involved in war with adjoining states or was torn by civil dissension. The last wars with Chile and Bolivia were particularly disastrous, since Peru was enabled to make peace only by ceding considerable territory. Boundary lines between the country and Bolivia are still unsettled and remain as a possible source of future difficulty. Since the last struggle the country has been comparatively peaceful and prosperous. Population, about 4,500,000.

Peru, ILL., a city in La Salle co., 60 mi. n. e. of Peoria, on the Illinois River, at the head of navigation, on the Illinois & Michigan Canal and on the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific railroads. It has a picturesque location and contains a public square and public parks. Saint Bede College is located here, and other prominent buildings are the Turner Hall and the Masonic Temple. Peru is near deposits of bituminous coal, white sand

rock and cement rock, and it has a foundry, a machine shop, a planing mill and manufactures of scales, clocks, implements and various other articles. In the vicinity are interesting relics of the mound builders. The place was settled in 1827 and was chartered as a city in 1852. Population in 1910, 7984.

Peru, IND., the county-seat of Miami co., 75 mi. n. of Indianapolis, on the Wabash River and on the Lake Erie & Western, the Wabash and other railroads. The city has a considerable trade with the surrounding agricultural region, and contains railroad shops, electric, carbon and steel works, candy factories, woolen mills and other works. Peru has a public library, Boyd Park, a sanatorium and the Wabash Railroad Hospital. It was incorporated in 1848. Population in 1910, 10,910.

Perugia, pa roo'ja, a city of central Italy, situated 48 mi. s. e. of Arezzo and 10 mi. e. of the Lake of Perugia, on the southern slope of the Apennines. It is of interest because of its historical associations. It has a university, founded about the middle of the thirteenth century, and contains a number of museums and antiquities. There are ruins of works built by the Etruscans and the Romans. At the height of its prosperity, Perugia was one of the twelve cities of the Etruscan League. Later it came under the rule of the Romans, and before the Middle Ages it became a possession of the popes. The present town is comparatively unimportant. Population in 1911, 65,805.

Perugino, pa roo je'no, PIETRO VANNUCCI (1446-1523), one of the chief masters of the Umbrian School of painting, born at Citta della Pieve. His most important work was *The Delivery of the Keys to Saint Peter*. About 1480 Pope Sixtus IV called him to Rome, where he was employed with other famous artists in decorating the Sistine Chapel with frescoes. Fine specimens of his frescoes are preserved in Perugia, Rome, Bologna and Florence, and specimens of his other works are not infrequent in European galleries.

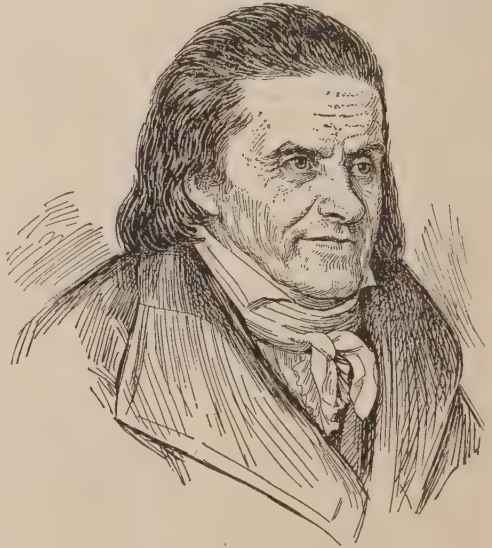
Peru'vian Bark, the bark of various species of trees of the genus *Cinchona*, found in many parts of South America, but more particularly in Peru. It was formerly called *Jesuits' bark*, from its having been introduced into Europe by Jesuits. Its medicinal properties depend upon the presence of *quinine*, which is now extracted from the bark, imported and prescribed in place of nauseous mouthfuls of bark. See **QUININE**.

Peseta, pa say'ta. See **FRANC**; **MONEY**.

Peso, pa'so, the monetary unit of several Central and South American nations, and formerly of the Philippine Islands, varying in value from 41 cents to \$1.03. It is usually divided into one-hundredth parts known as *centimos*, *centimes* or *centavos*, and coins in multiples of the unit and of these subdivisions are also issued. See **MONEY**.

Pessimism, pes'i miz'm, a view of life which, opposed to optimism, is peculiar to those who believe that evil overrules good in the government of the world. The advocates of this doctrine find its chief justification in what they consider the unmerited and unreasonable suffering that forms so large a part of common experience. Though ordinarily regarded as merely the product of morbidness, pessimism is, in its deepest expression, a craving for a life that is more than finite and mortal. This view of life is developed and systematized in the philosophy of Schopenhauer. Pessimism, like optimism (which see), to a greater or less extent influences every life.

Pestalozzi, pes ta lot'se, JOHANN HEINRICH (1746-1827), a Swiss educator and reformer, born at Zurich, where he was educated at the university. Early in life he became acquainted with the wretchedness of the lower classes, and after failing in several occupations, he decided to devote his life to the work of a teacher. He opened his house at Neuhof to the children of the poor, and in addition to the instruction of



JOHANN HEINRICH PESTALOZZI

the home, he used his farm as a means of giving them industrial training. However, his efforts were not appreciated, and his enterprise failed

for want of proper support. But his experience had made him so thoroughly acquainted with the conditions of society that he resolved to continue the work. About this time he published *Leonard and Gertrude*, a work in which he set forth his ideas of education.

In 1798 he opened a school at Stanz for orphan children who had been deprived of their homes through the French invasion of Switzerland. Within a few months, however, the military situation compelled him to abandon the school, and he removed to Bergdorf where he opened a tuition school, which was later removed to Yverdun. It was in this school that Pestalozzi established his reputation as an educational reformer. Here he gathered about him pupils from nearly every country of Europe and from the United States. Such was the reputation of his school that it was visited by the rulers and leading educators of the world. However, he was not a good administrator, and within a few years dissensions arose among the faculty, which caused the school to lose its influence, and finally Pestalozzi was obliged to give it up. He died in comparative poverty.

The value of Pestalozzi's work as an educator consists largely in the principles which he set forth and attempted to put into practice. He believed that the principles of education were to be found in human nature, and that this nature consisted of physical, intellectual and moral capabilities, all of which should be trained. He also believed that it was the duty of the teacher to remove obstructions from the way of his pupils and to stimulate them in the exercise of all their powers. He was a strong advocate of education through observation, or the cultivation of the senses, and believed that all knowledge began in this way, and that the child should acquire his ideas through his own activity, under the direction of the teacher. He was a strong advocate of industrial education and believed that it should go hand in hand with intellectual and moral training. The soundness of his principles is shown from the fact that they now form the basis of instruction in the normal schools of Europe and the United States. Consult De Guimps's *Pestalozzi; His Life and Work*.

Peter or **Simon Peter**, one of the apostles of Jesus, generally considered the leader of the twelve. But little is known of his early life. Previous to his call by Jesus, he, with his brother Andrew, was a fisherman on the Sea of Galilee. Both were attracted by the preaching of John the Baptist and followed him; afterwards they

returned to their ordinary occupation until called by Jesus, when they gave up their calling and devoted the remainder of their lives to the propagation of the Gospel. During Jesus's brief career upon earth, Peter was one of his most devoted followers, and after the ascension he was recognized as the leading spirit in the movement to spread Christianity. A comparatively full account of his activities is found in the *Acts of the Apostles*. He is also the author of two books of the New Testament, the *First Epistle General of Peter* and the *Second Epistle General of Peter*. But little is known of his last years. He is supposed to have been put to death by crucifixion at about the same time that Saint Paul was executed.

Peter I, ALEXEYEVITCH (1672–1725), emperor of Russia, known as Peter the Great. In 1682, on the death of his brother Feodor, Peter was declared czar; but his half-sister Sophia, ambi-



PETER THE GREAT

tious to govern, succeeded in having her brother Ivan proclaimed czar jointly with Peter, with herself as regent. Peter was relegated to private life, his education was purposely neglected and his bad habits were encouraged. In 1689 he wrested the power from his sister and confined her in a convent. Peter was then virtually sole emperor, though, till the death of his brother, in 1697, he associated Ivan's name with his own in the decrees of the Empire.

He then determined to do what he could to raise his country out of its barbarism and to place its people in the ranks of civilized nations.

His journey to Holland and England, when he worked at several humble trades, brought him knowledge by which he amply profited on his return. He not only created a navy, but gave Russia a seaboard and seaports by wresting the Baltic provinces from Charles XII of Sweden. Young Russian nobles were obliged to travel to acquaint themselves with the customs of other countries; schools of navigation and mathematics were founded; agriculture was improved by the introduction of implements, seeds and superior breeds of cattle. Peter imported foreign artisans of all kinds, established manufactories of arms, tools and fabrics and improved the roads and canals throughout the country. In 1703 he laid the foundation of Saint Petersburg, and twenty years later, of its Academy of Sciences. Laws and institutions which in any way interfered with his projects he either abolished or altered. In his zeal to do good he was frequently injudicious in choosing times and seasons, and the least show of opposition irritated him into ferocity. He repudiated his wife a few years after marriage, for her reactionary leanings, and for the same reason his son Alexei was ill treated, compelled to renounce the succession and condemned to death. He was later pardoned, but died suddenly as a result of the treatment he had received. Peter married, in 1712, his mistress, Catharine, who was crowned in 1724 and who succeeded him as Catharine I.

Peter I, KARAGEORGEVITCH (1846-), king of Servia, the grandson of the famous Black George, the leader of the Servians in their attempt to free themselves from Turkish rule. After many years spent in the army and in adventurous roving about Europe, he settled in Switzerland, where he lived quietly until 1903. In that year, four days after the murder of King Alexander of Servia, he was proclaimed king.

Peterborough, a city of Canada, in the Province of Ontario, capital of Peterborough co., on the Otonabee River and on the Grand Trunk and the Canadian Pacific railroads. It is about 94 miles northeast of Toronto. It is a well-built city, with good water power, and it has manufactures of machinery, agricultural implements, wooden ware and iron castings. Its trade is large, especially in grain, pork and lumber. Population in 1911, 18,360.

Petersburg, VA., a city at the junction of Chesterfield, Dinwiddie and Prince George counties, 22 mi. s. of Richmond, on the Appomattox River, on the Upper Appomattox Canal

and on the Norfolk and Western, the Atlantic Coast Line and the Seaboard Air Line railroads. The place was settled in 1733 on the site of an indian village destroyed in the seventeenth century. It was incorporated as a town in 1748 and as a city in 1850. During the Revolution it was twice occupied by the British, and a number of engagements were fought here. Because of its being an important railroad center, it was the scene of constant fighting during the last year of the Civil War in America (See PETERSBURG, SIEGE OF). Fourteen battles were fought in and around the city. The city is in an agricultural region in which tobacco is the chief product. There is good water power, and the manufactures include tobacco, cotton, silk, knit goods and other articles. The city has the Southern Female College, University School for young men, the Virginia Normal and Collegiate Institute for colored students and the State Central Hospital for colored insane. Other important structures are the Y. M. C. A. building, the Home for the Sick, the Benevolent Mechanics' Association building, with its library and museum, and the Masons', Odd Fellows' and Red Men's buildings. Population in 1910, 24,127.

Petersburg, SIEGE OF, a famous siege of the Confederate position at Petersburg, between June, 1864, and April, 1865. The Federal army was commanded by Grant, who, after his famous Virginia campaign, took up his position before Petersburg, with the intention of capturing this point and thus compelling Lee to evacuate Richmond. An assault made on the fifteenth of June by General Butler with a force largely outnumbering the defenders, failed through poor leadership, and other assaults on the three following days were equally unsuccessful and resulted in a loss of fully ten thousand men. On July 30 occurred the fiasco of the famous Petersburg Mine. The mine had been run under the Confederate fort for a distance of more than five hundred feet by General Burnside, who planned to lead a charge through the gap in the works which was to be made by the explosion. Inefficient leadership caused the Federals to be trapped in the crater and mowed down by the thousands by the steady Confederate artillery fire. Other assaults upon the works were made from time to time, but without effect, until April 2, 1865, when a continuous bombardment of more than a week compelled Lee to evacuate both Petersburg and Richmond.

Peterson, FREDERICK (1859-), an American physician who served as professor in a

number of prominent universities, and who finally located in New York City, where he became the head of the department of nervous diseases in the College of Physicians and Surgeons. Besides publishing a book, *Mental Diseases*, he served for many years as one of the principal editors on several of the leading medical journals.

Peter the Hermit or Peter of Amiens (about 1050–1115), an enthusiastic monk of Amiens, whose preaching, after a pilgrimage to the Holy Land, gave rise to the First Crusade. Peter led the way through Hungary at the head of an undisciplined multitude of more than 30,000 men, a comparatively small number of whom survived to reach their destination. He distinguished himself by his personal courage at the storming of Jerusalem. On his return to his native country he founded the abbey of Noirmoutier.

Petition, *pe tish' un*, an appeal made to one who has power to grant it. The first amendment to the Constitution of the United States provides that Congress shall make no law "abridging the right of the people peaceably to assemble, and to petition the government for a redress of grievances." The right of petition has always been treated as a natural right, whereby the citizen can make his grievances known to the highest authority in the government.

Petition of Right. When Charles I assembled Parliament in 1628, one of the first actions of the House of Commons was to draw up a statute detailing the grievances which they felt they had against the king, and this statute, from the form in which it was presented, was known as the Petition of Right. It made no pretense of being a new law, but simply rehearsed the old statutes which Charles had violated and begged that the ancient rights might be confirmed. Besides the most important provision, that free-men should not be arrested without due legal process, it cited those statutes which forbade the levying of taxes or loans without the consent of Parliament, the quartering of soldiers upon private citizens and the proclamation of martial law in time of peace. Charles attempted to return an equivocal answer to this document, but was obliged to assent to it when Parliament began proceedings against the duke of Buckingham.

Petos'key, MICH., a city in Emmet co., 43 mi. s. w. of Cheyogan, on Little Traverse Bay, which is an arm of Lake Michigan, and on the Grand Rapids & Indiana and the Pere Marquette

railroads. It has steamer connection on the Great Lakes and is an attractive summer resort. The city contains a public library, a normal school, the Lockwood Hospital and nine churches. The industrial establishments are lumber mills, leather factories, paper mills, machine shops and other factories. It was settled in 1874 by traders and missionaries and was incorporated as a city in 1896. Population in 1910, about 5000.

Petrarch, *pe'trahrk*, FRANCESCO (1304–1374), an Italian poet and scholar, born at Arezzo. It was at Avignon in 1327 that he first saw, in the Church of Saint Claire, the Laura who exercised so great an influence on his life. After this first meeting Petrarch remained at Avignon three years, singing his purely Platonic love and haunting Laura at church and in her walks. He then spent several years in traveling, visiting the chief cities of France, Italy and Germany, and on his return he bought a small estate at Vacluse, near Avignon, that he might be near Laura. At intervals during the rest of his life, he traveled again through Italy, and many honors were shown him. In 1341 he was called to Rome to receive the laureate crown awarded for his Latin poem of *Africa*, an epic on the Punic wars. At Parma he learned of the death of Laura, which he celebrated in his *Triumphs*. A large part of his time was employed in various diplomatic missions until 1370, when he took up his residence at Arquà, near Padua, where he passed his remaining years in scholarly pursuits. Although Petrarch based his hopes of fame upon his scholarly Latin works, these are practically forgotten now, while his Italian verse, of which he thought comparatively little, has made him famous for all time.

Pet'rel, an oceanic bird, about the size of a large duck. It resembles the gulls, but usually



MOTHER CAREY'S CHICKENS

lives farther out at sea and is found in prodigious numbers breeding in the Arctic and Antarctic regions. Petrels are strong on the wing and sail about with very little visible motion. Often they

are seen to run rapidly along the surface of the water, and it is their habit to follow ships sometimes many days from shore, in order to get the refuse which is cast overboard. *Mother Carey's chickens*, or the *stormy petrels*, are common birds that are thought by the sailors to foretell the approach of a storm, and in consequence sailors never injure them. The *fulmar* is a petrel common on the North Atlantic coast, valuable for its feathers and down and for an oil found in its stomach.

Pe'trie WILLIAM MATTHEW FLINDERS (1853-), a British Egyptologist, born in Woolwich, England. From 1870 to 1875 he devoted his time to research in meteorology, and the next few years, to mapping and measuring ancient British earthworks. In 1880 he became interested in investigations of the pyramids of Gizeh, Egypt, where he spent a great deal of his time, having been given charge of the excavations in the Delta carried on by the Egypt Exploration Fund. The reports which he has published are highly valued by Egyptologists, and the discoveries and investigations which he has made have added a great deal to knowledge of the ancient Egyptians. Among the works which he has written are *The Pyramids and Temples of Gizeh*; *The History of Egypt*; *Egyptian Tales*, and *Royal Tombs of the First Dynasty*.

Petrograd, formerly called St. Petersburg, the capital of the Russian Empire, situated on the Neva where it enters the Gulf of Finland, 400 mi. n. w. of Moscow. The city is built upon low land which is subject to overflow, and much of this is protected by walls and by the construction of canals, which receive the surplus water. Before entering the gulf, the Neva divides into several arms, forming a delta, most of which is within the city limits. The main branch, known as the Great Neva, divides the city into two chief divisions, the right side, which was the nucleus of the city in the time of Peter the Great, and the left or "great" side, on the mainland to the south, which now is the center of business, fashion and government. These sections and the numerous islands occupied by the city are connected by over 120 bridges, some of which are supported on pontoons, so that they can be removed during the winter. The left side, or "great city," is divided into four quarters, the most important of which is the admiralty quarter, on the south bank of the river and in the center of the city. This quarter is so named from the admiralty building, a structure about 1600 feet long, which

contains the admiralty offices and a museum. From this square the four principal streets of the city radiate. Of these the Nevski Prospekt is the finest and is considered one of the famous streets of Europe. It is 130 feet wide and about 4 miles long. It is planted with shade trees on both sides and contains the most beautiful palaces, some of the principal churches and the finest stores in the city. On the southeast of the admiralty building are the Alexander Gardens, and on the southwest is Peter Square, con-



taining a colossal equestrian statue of Peter the Great; beyond this square are the buildings of the senate and the Holy Synod. To the southwest of the admiralty is the Cathedral of Saint Isaac, the most celebrated cathedral of the city. It is built in the form of a Greek cross and is surmounted by a large gilded dome. The porticoes are single pillars of polished granite, over 50 feet high. To the northeast of the admiralty extend the palaces, the most famous of which is the Winter Palace of the czar, the largest, and in many respects the most celebrated, royal palace in the world. It has accommodations for over 6000 people. Adjoining the Winter Palace is the Hermitage, which contains one of the finest art galleries in Europe. In Palace Square, to the southeast of the Winter Palace, is the Alexander Column, a monument nearly 100 feet high, erected to Alexander I.

One of the islands is occupied by the old Fortress of Saints Peter and Paul, which was the original nucleus of the capital and is now used as a city prison. Within this enclosure is also the Cathedral of Saints Peter and Paul, in which the czars and other members of the royal families are buried. Another island is occupied by the University of Petrograd and other prominent educational institutions, while a third is the site of a fine botanical garden.

Petrograd is the literary and intellectual center of Russia and contains a number of higher institutions of learning. Chief among these is the University of Petrograd. Others worthy of note are the Academy of Sciences, with a library

Petrograd

of over 500,000 volumes; the Institute of Technology, which is an industrial school; the Conservatory of Music, founded by Rubinstein, and numerous schools for the higher education of women, as well as technical schools in medicine and the various branches of natural science. The Imperial Public Library contains over 1,300,000 volumes and nearly 40,000 manuscripts and is exceeded in size only by the British Museum and the Bibliothèque Nationale at Paris.

Petrograd is the great commercial and industrial center, and notwithstanding the fact that its port is closed by ice during several months of the year, its exports and imports are extensive. The industrial portion of the city is located on the right or Petrograd side, where are found most of the large factories and the residences of the workmen. The leading industries are the manufacture of textiles, india rubber goods, tobacco products, leather, machinery and various stone products. The city is the western terminus of the trans-Siberian and other important trunk lines of railroad in the Empire.

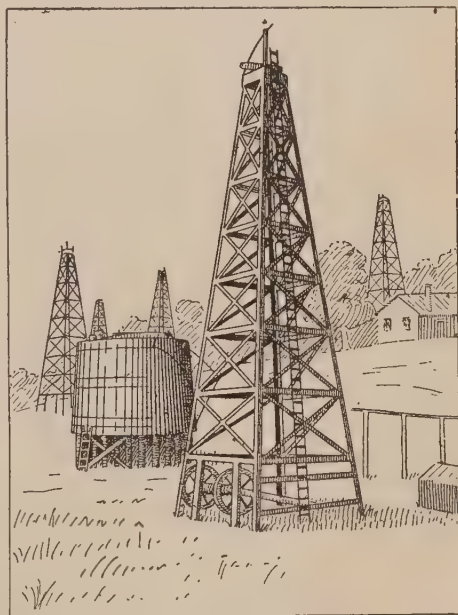
The fort erected by the Swedes at the mouth of the Neva was captured by Peter the Great in 1703, and he immediately decided to make this the site of the capital of the Empire. By 1712 he was enabled to remove the government to the new capital, and from that time the city increased in population and importance, until now it has become one of the most distinguished capitals of Europe. In 1914, as a result of the great War of the Nations, there was such bitter feeling against all things German, that the Czar, by special edict, changed the name from St. Petersburg, a German form, to Petrograd, which is Russian for "Peter's City." Petrograd differs from other Russian cities in having the fashionable quarters regularly laid out and the streets faced by buildings which are aligned with military precision. Most of the large structures are built of gray stone, so that the city is devoid of all contrasts in color, in which respect it is different from Moscow and other Russian cities. Aside from the fashionable quarter, the streets present a dreary, monotonous appearance and are lined with wooden buildings of inferior structure. Population in 1910, 1,907,708.

Petroleum (rock oil), a mineral oil, occurring in rock or sand in various countries. It is a variety of bitumen. In the United States it occurs in large quantities in Pennsylvania, in the southern part of Ohio, in certain sections of West

Petroleum

Virginia, in the region around Beaumont, Tex., in the southern part of California, in Colorado, Kansas and other states. Valuable oil fields have also been discovered in Alaska. Petroleum is also found in Canada, around the Caspian Sea, in Russia and in Burmah. In these places it sometimes flows from the earth and accumulates on the surface of pools of water or streams. In other places it exudes slowly from seams in the rock and hardens on coming in contact with the sun and air; but the petroleum of commerce is obtained by boring wells into the layer of sand or rock which contains it. In some instances the oil is confined under great pressure, and when the reservoir is struck the well flows in a steady stream, often producing a fountain which extends several feet into the air. When the pressure is low, the oil has to be pumped. For the structure of these wells, see **WELL BORING**.

As it comes from the wells, petroleum is a dark-colored, oily liquid, varying in shades from brown to black, and in thickness from the consistency of kerosene to that of warm tar. In this condition it is known as *crude petroleum*. Crude



OIL WELLS AND TANKS

petroleum is extensively used in Texas, New Mexico, Arizona and the southern part of California for fuel, also in some places for improving roads by the process known as *oiling*. When a thin coating of oil is spread over a road made of fine sand and soil, it gradually sinks into the surface

and cements it together, drying and making a hard surface that will wear for years.

Before petroleum can be used for other purposes, however, it needs to be refined, or distilled. This is done by placing the oil in huge tanks, each containing 1200 barrels or more. These are heated by steam. The different products are thus separated by distillation. The most volatile, such as naphtha and benzine, are driven off at a low temperature. After these have been expelled, the temperature is raised, and kerosene, the most valuable of all products, is obtained. After the separation of the volatile products, the fuel oils, paraffin oils and paraffin still remain. By further distillation of these, lubricating oil, coke, coal tar, paraffin and pitch are obtained. Each of these is described under its title.

By far the most important use of petroleum is for illuminating purposes, in the form of kerosene. The oil and its refined products are transported in various ways. For the transportation of crude oil, pipe lines lead from the oil regions to the large refineries, the oil being pumped as far as from the Pennsylvania fields to Chicago. For the distribution of petroleum, tank steamers are constructed for water transportation, and tank cars, for transportation by railways. These cars are familiar sights on all lines of railway, and the oil company usually establishes in every large town a depository, which consists of several metallic tanks, to contain the oil of different grades. As the cars arrive they are emptied into these tanks, from which the oil is distributed to the local dealers.

Russia and the United States are the leading countries in the production of petroleum, and their output constitutes over nine-tenths of all that produced in the world. The production in the United States amounts to about 165,000,000 barrels a year. While Russia produces the largest quantity of crude petroleum, the United States leads in the production of the manufactured products.

The petroleum industry in the United States dates from 1859, when Col. E. L. Drake of Titusville, Pa., sank a well that produced 25 barrels a day. Colonel Drake's purpose in sinking the well was to obtain a supply of oil which he could put upon the market under the name of *Seneca oil*, as a remedy for rheumatism. Other wells immediately followed Drake's, and within two years the industry was firmly established in and about Oil City and Titusville. From that time the petroleum industry has continued to grow, until it has reached its present proportions.

Petu'nia, a genus of plants, belonging to the same family as the potato and tobacco. Petunias are much prized by gardeners for the beauty of their flowers. There are a great number of varieties, with large flowers, varying from white to violet, rose, pink and many other colors. The genus is a native of South America.

Pe'wee. See PHOEBE.

Pew'ter, an alloy of tin and lead, or of tin with proportions of lead, zinc, bismuth, antimony or copper, used for domestic utensils. One of the finest sorts of pewter is composed of 100 parts of tin to 17 parts of antimony, while the common pewter, of which beer mugs and other vessels are made, consists of 4 parts of tin and 1 of lead. The kind of pewter of which teapots are made is an alloy of tin, brass, antimony and bismuth; it is often known as *Britannia ware*.

Phædra, *je'dra*, in Greek mythology, daughter of Minos, king of Crete, and sister of Ariadne. She was sought in marriage by Theseus and was brought to Athens. There, however, she fell in love, not with Theseus, but with his son Hippolytus. As he refused to comply with her request and elope with her, she accused him to his father of having tried to kidnap her, and in response to the prayers of Theseus, Hippolytus was killed by Neptune. When his drowned body was thrown at the feet of Phædra, she became repentant, confessed her sin and killed herself.

Phaethon, *ja'e thon*, in classical mythology, the son of Apollo and Clymene. Having boasted to his companions that the sun god was his father, he was mocked by them, and when he reported this to his mother, she advised him to visit Apollo and ask his recognition. Apollo gladly acknowledged Phaëthon as his son, and in response to a request, he promised to prove their relationship by granting to Phaëthon anything he might ask. When, however, the boy begged to be allowed to drive the chariot of the sun for one day, Apollo repented of his promise and tried to persuade the boy of his folly. Phaëthon was determined, however, and at last Apollo reluctantly entrusted him with his fiery steeds, giving him strict directions as to how to drive. The horses, however, immediately recognized that their master did not have hold of the reins, and they dashed wildly out of their course, coming at some times so near to the earth that they almost set it on fire, and turned black the races living in Africa; at other times they rose so far above the earth that everything was frozen. Jupiter, seeing this destruction and fearing for

what else might happen, struck Phaëthon with a thunderbolt and threw him into the river Po. See MYTHOLOGY, Volume V.

Phaeton, *fa'e ton*, the name given to a light pleasure carriage, with a low body and low wheels. The name is used very loosely and is applied to pleasure carriages of a number of widely different patterns.

Phalanx, *fa'lanks* or *fal'anks*, a name given generally by the Greeks to the whole of the heavy armed infantry of an army, but more specifically to each of the grand divisions of that class of troops, when formed in ranks and files close and deep, with their shields joined and their pikes crossing each other. The Spartan phalanx was commonly 8 files deep, while the Theban phalanx was much deeper.

Phanerogamous, *fan ur og'a mus*, **Plants** or **Phanerogams**, *fan'ur o gamz*, the general name for a great division of flowering plants, also called *phaenogams*, in distinction from *cryptogams*. As these names have perpetuated a misconception as to their manner of growth, the more modern name of *spermatophytes* is now in more general use. The chief distinction between the two great classes of plants is that the spermatophytes produce seeds containing an embryo, while the cryptogams produce spores which are simple cells without an embryo. To the phanerogams belong nearly all of those plants which are conspicuous and most of those which are useful to man.

Pharaoh, *fa'ro* or *fa'ra o*, the name given in the Bible to the kings of Egypt, corresponding to the P-RA or PH-RA of the Egyptian hieroglyphics, which signifies *the sun*. The identification of the Pharaohs mentioned in Scripture with the respective Egyptian kings, particularly the earlier ones, is a matter of great difficulty. See EGYPT.

Pharisees, *far'i seez*, a religious sect which had risen into great influence among the Jews at the time of Christ and which played a prominent part in the events recorded in the New Testament. The most probable account of the origin of the Pharisees as a distinct sect is that which refers it to the reaction against the attempt of Antiochus Epiphanes to break down the distinctions between his Jewish and his Greek subjects. At the time of Christ the Pharisees stood as the national party in politics and religion, the opponents of the Sadducees. The fundamental principle of the Pharisees was that of the existence of an oral law to complete and explain the written law. "Moses," says *Mishna*, "received the law (the unwritten law is meant) from Sinai

and delivered it to Joshua, and Joshua to the elders, and the elders to the prophets, and the prophets to the men of the Great Synagogue." This oral law declared the continuance of life after the death of the body and the resurrection of the dead. In process of time, additions, which were not pretended to be derived directly from Moses, were made, namely, (1) decisions of the Great Synagogue by a majority of votes on disputed points; (2) decrees made by prophets and wise men in different ages; (3) legal decisions of proper ecclesiastical authorities on disputed questions. These authorities comprehended both the writers of the sacred books and their approved commentators. There is no doubt that, though their strict observance of small points often led to hypocrisy and self-glorification, the sect contained a body of pious, learned and patriotic men of progress. Paul and his teacher Gamaliel were both Pharisees.

Pharmacist, *fahr'ma sist*. See APOTHECARY; PHARMACY; PHARMACOPOEIA.

Pharmacopoeia, *fahr'ma ko pe'ya*, a book compiled by a government or by national conventions, which contains such information as descriptions of medicines, tables of doses, formulas and standards of purity and strength. In the United States the medical colleges and societies appoint delegates, who meet in a national convention and prepare the United States Pharmacopoeia. These conventions have been held in Washington every ten years since 1820, the last edition of the Pharmacopoeia having been published in 1905. The laws of the states and of Congress enforce the authority of this book. Every pharmacist should know his Pharmacopoeia thoroughly, and physicians should be well acquainted with it.

Pharmacy or **Pharmaceutics**, *fahr'ma su'tiks*, the art of preparing, compounding and dispensing medicine. Physicians were the first pharmacists, for originally they prepared their own medicines, but as practice grew broader and drugs were more generally used, a separate profession, that of the pharmacist, naturally arose. The laws of almost every state now rigidly exact a technical education and drug store experience before licensing pharmacists to practice. Many schools, some of them connected with the most prominent universities in the United States, give, in courses extending over two or four years, the training necessary, though in most states the license to practice must be obtained directly from a specially appointed board of pharmacy. Pharmacists still use, in compounding their

Pharos

medicines, the old apothecaries' weight, whose pound, divided into ounces, drachms, scruples and grains, contains 5760 grains.

Pharos, *fah'ros*, a peninsula, formerly an island, on the western end of the Egyptian coast, now occupied by part of the modern city of Alexandria. It is chiefly famous as the site of the famous Pharos, or lighthouse, erected by Ptolemy I and Ptolemy Philadelphus. This lighthouse, which rested on a base 100 feet square, was several hundred feet high and stood for nearly sixteen hundred years, until destroyed in the fourteenth century by an earthquake. It was considered one of the seven wonders of the ancient world.

Pharynx, *far'inks*, the term applied to the muscular sac which lies between the cavity of the mouth and the narrow esophagus, with which it is continuous. It is of a funnel shape, is about $4\frac{1}{2}$ inches in length and communicates with the two nostrils, the two Eustachian tubes, the mouth, the larynx and the esophagus. It aids in swallowing and in producing the higher notes of the voice.

Pheasant, *fej'ant*, the general name given to that class of birds of which the common barnyard fowl, the cock and the hen, are the best representatives. Most species are handsome, the males being distinguished by bright plumage, long tails and conspicuous crests. They are not natives of the United States. The common



SILVER PHEASANT

pheasant is a native of Asia, but was introduced into Europe and has been partially domesticated in the United States under the name of English pheasant. Including the tail, which is about eighteen inches long, the bird has a length of three feet. The male is reddish-brown above, with blue, green and gold reflections on the head, bare cheeks, and purplish-brown sides and lower parts. The tail has black cross bands. The female is smaller and of more sober coloring.

Phidias

The *golden pheasant*, found in China, is characterized by its bright and varied plumage. It is golden yellow and scarlet above, its crest is light yellow, its back, green, its wings, blue, and



TIBETAN PEACOCK

its long and graceful tail, handsomely variegated. The *silver pheasant* of China is pure white, streaked with black, except for its throat, underparts and large crest, all of which are shining black. There is a bright red velvety space about its ears, and its feet and legs are purple. Numerous other species are prized for their beauty, and some of them have been domesticated. The *peacock pheasants*, common from India to China and on the Malayan islands, include many species, among which the *Tibetan peacock* is well known.

Phelps, *felps*, ELIZABETH STUART. See WARD, ELIZABETH STUART PHELPS.

Phenacetine, *fe nas'e tin*, a coal tar product, given by physicians as a medicine to relieve pain. It is similar in its effects to antipyrine, but is considered less dangerous.

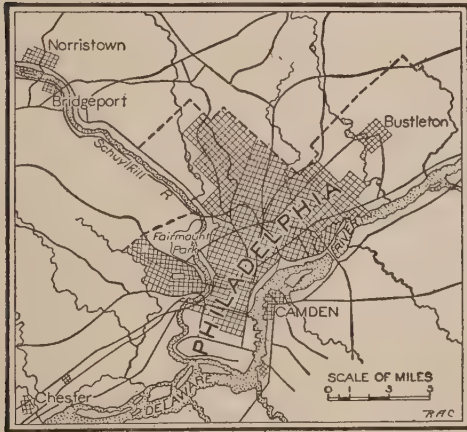
Phenic, *je'nik*, **Acid** or **Phenol**. See CARBOLIC ACID.

Phi Beta Kappa, *fi' ba'ta kap'pa*, the earliest of the Greek letter societies, founded in December, 1776, at William and Mary College, in Virginia. The letters are the initials of the Greek words meaning "Philosophy, the guide of life," adopted as the motto of the society. The badge chosen was a gold watch key. Gradually the society lost its secret character and became a purely honorary organization, and as such it exists in most of the larger colleges of the United States.

Phidias, *fid'i as*, the greatest of Greek sculptors, was born about 490 B. C., in Attica, and flourished in the Age of Pericles, but of his life few particulars are known. His name is always associated with the buildings which crown the Acrop-

olis at Athens, for in the Parthenon was his colossal statue of Athena, made in ivory and gold, representing the goddess standing with a spear in one hand and an image of Victory in the other. The statue, with the pedestal, was about 41½ feet in height. His colossal statue of Zeus, at Olympia, was ranked for its beauty among the wonders of the world. Zeus was here seen sitting upon a throne, with an olive wreath of gold about his temples. The upper part of his body was naked, and a wide mantle covered the rest of it, hanging down in the richest folds to his feet, which rested on a stool. The nude parts of the statue were of ivory, the dress was of beaten gold. The right hand held a Victory, and the left held a scepter tipped with the eagle. The Zeus was removed to Constantinople by Theodosius I and was destroyed by fire in 475 A. D. Phidias was accused of impiety, perjury, embezzlement and various other crimes, and it is thought that he finally died from poison. None of all the works which made his name famous now remains.

Philadelphia, *fil'a del'fe a*, PA., the county-seat of Philadelphia co., chief city of the state



and third city of the United States, situated on the Delaware River, at its confluence with the Schuylkill, about 100 mi. from the ocean, 90 mi. s. of New York, 136 mi. n. of Washington and 822 mi. s. e. of Chicago. It is on the Pennsylvania, the Philadelphia & Reading, the Baltimore & Ohio, the Lehigh Valley and other railroads.

The city extends for 22 miles along the Delaware, and in breadth from east to west it varies from 6 to 10 miles, its area being about 130 square miles. The older part of the town occupies the ground between the Delaware and Schuylkill

rivers and contains the business center and most of the leading industries. The city is laid out in accordance with a plan devised for the site it was to occupy, and it is one of the best-arranged cities in the world. The streets run north and south and east and west. Those parallel with the Delaware are numbered and begin with the one nearest the river. Those extending east and west are named. Market Street, the chief business thoroughfare running east and west, divides the city into north and south sides, and Broad Street, the chief north and south thoroughfare, divides the portion between the rivers into east and west sides. That part of the city beyond the Schuylkill is known as West Philadelphia. The buildings are numbered in accordance with the streets, each block beginning with a new hundred, so that from the number and the letters indicating north and south, east and west, one can tell at once the location of any building. In the older part of the city the streets are quite narrow, so that in a few of them street cars can run in only one direction; but the residential sections and the newer parts of the city have wider streets. Most of the streets are paved with brick, stone or asphalt, or are macadamized.

Philadelphia is frequently known as the *Quaker City*, the *City of Brotherly Love* and as the *City of Homes*. The last term is especially appropriate, for in no other city in America are found so many small houses owned by their occupants. All of the older buildings and many of those of later construction are of red brick, and the houses have wide marble steps and trimmings. This style of architecture gives Philadelphia an individuality seen in no other city in the United States. In some sections of the city the continuation of the same style of houses for many blocks gives the streets a monotonous appearance.

PARKS. The park system began with the original plan of the city in the establishment of numerous small parks, known as *squares*. These are distributed throughout the more densely populated sections, and many of them are noteworthy for their trees, shrubbery and statuary. On the south side of the city is League Island Park, adjoining the navy yard, which is on an island of the same name. To the east of this is Point Breeze Park, and some blocks north of this is Girard Park, which occupies about four squares. In the heart of the city are found Jefferson Square, Rittenhouse Square, which is in the center of the best residential section; Washington Square, Independence Square, Franklin

Square, and Logan Square; but by far the most important of the city's pleasure grounds is Fairmount Park, containing nearly 3000 acres. This is located on the west side of the city and is divided by the Schuylkill into East Park and West Park. Another portion, extending along the Wissahickon, is known as the Wissahickon Valley. This is a deep ravine which has been preserved almost in its natural state. Fairmount Park contains many objects of historic interest. Among these is the cottage of William Penn, the first brick building erected in Philadelphia, which has been transferred from its original site, on Letitia Street, near the river. On Lemon Hill is the house in which Robert Morris lived during the Revolutionary War. At the Green Street entrance of the park is the Washington Monument, which was erected by the Society of Cincinnati at a cost of \$250,000. There are also a number of statues of noted men, including those of Goethe, Schiller, Columbus, Lincoln, Grant, Meade and Garfield. This park contains many miles of drives and boulevards and over ten miles of bridle paths. In the southern portion of the West Park was located the Centennial Exposition, held in 1876. Two of the original buildings, Horticultural Hall and Memorial Hall, still remain. The former contains a fine collection of tropical plants, and the latter is used as an art gallery and museum. Adjoining this part of the park on the south is the zoological garden, which contains one of the finest collections of animals in America.

BUILDINGS. Philadelphia contains a number of buildings of historic interest, and these have been carefully preserved. Carpenter's Hall, on Chestnut Street, between Third and Fourth, is a plain two-story brick structure, in which the First Continental Congress met in 1774. Independence Hall, on Chestnut, between Fifth and Sixth streets, is the structure around which cluster the most interesting associations. This is the building in which the Declaration of Independence was passed; it was occupied by the Continental Congress during most of the time of its existence, and in it the Constitution of the United States was framed. It contains many of the articles of furniture used by the old Congress and by the Constitutional Convention, as well as the old Liberty Bell which was rung at the passage of the Declaration of Independence (See **INDEPENDENCE HALL**). The Betsy Ross house, on Arch Street above Second, is the house in which the first American flag was made. The old London Coffee House, which in Revolutionary times

was frequented by the leading men of the city and nation, stands on the corner of Front and Market streets. The Girard National Bank was originally built for the first United States Bank, and Christ's Church, on Second and Market Streets, begun in 1695, is one of the oldest buildings in the city.

First among the modern buildings, in importance and interest, is the city hall, usually known by Philadelphians as the "public building." This structure occupies nearly all of the square at the intersection of Market and Broad streets. It is 486 feet by 470 feet, is constructed of marble, has a height of 90 feet, with corner pavilions rising to 161 feet, central pavilions to 203 feet, and a tower surmounted by a colossal statue of Penn 37 feet high, the top of which is 548 feet from the ground. This building is occupied by the county and city offices and has cost, including erection and furnishings, nearly \$25,000,000. The tower contains a clock with dials 30 feet in diameter. Next in importance are the Federal buildings, including the new United States mint, on Spring Garden Street; the postoffice, which occupies the site of the first president's mansion, on Market and Chestnut, between Ninth and Tenth; the customhouse, near the river, and the arsenal, on the south side of the city, near the Schuylkill. Other buildings worthy of note, because of their architecture, are the Masonic Temple, the Odd Fellows' Hall, the Young Men's Christian Association building, the Arcade building, the Betz building, the Commonwealth Trust building, the Drexel building and the terminal stations of the Pennsylvania and the Reading railroads. The Bourse building is the home of the Board of trade, and contains a large commercial museum. Among the churches, the most important are the Roman Catholic Cathedral, the largest church in the city; the Arch Street Methodist Episcopal, the Holy Trinity, the Friends' Meeting House, on Arch Street, and the First Presbyterian.

INSTITUTIONS. Chief among the educational institutions is the University of Pennsylvania, occupying a beautiful site west of the Schuylkill and south of Market Street (See **PENNSYLVANIA, UNIVERSITY OF**). Next in importance is Girard College, in the northern part of the city. This is one of the most heavily endowed educational institutions in America (See **GIRARD COLLEGE**). The Drexel Institute has attained a wide reputation as an industrial school (See **DREXEL INSTITUTE**). Besides these there are many other colleges and secondary schools maintained by differ-

ent religious organizations. Among the public school buildings, the boys' high school and the girls' high school are worthy of note. In the line of scientific education should be mentioned the Academy of Natural Sciences and the Franklin Institute. Philadelphia is well supplied with libraries. That of the Library Company, which is the public library, has over 250,000 volumes, and maintains, besides the central library, 14 branches in different parts of the city. The University of Pennsylvania, Girard College, Drexel Institute and other institutes also have large libraries. Among the institutions of charitable nature are the hospitals for the insane, the general and the municipal hospitals and the Pennsylvania Hospital, founded in 1751, at the instigation of Benjamin Franklin. In addition to these are numerous charitable institutions maintained by the different religious denominations of the city.

COMMERCE AND INDUSTRY. Philadelphia is one of the great industrial centers of the country, being exceeded only by New York and Chicago in this respect. It is the first city in the Union in the manufacture of chemicals, woollens and hosiery; the second in bookbinding and the manufacture of blank books and of tobacco and cigars; the third in the manufacture of iron and steel, hats and caps, and in the printing of newspapers and periodicals, and the manufacture of clothing. It is especially noted for its manufacture of carpets. Among its great industrial establishments are found the Baldwin Locomotive Works, the largest works of the kind in the world, and the Cramp shipyards, in which are built some of the largest and best ships made in the United States. The Delaware admits the largest ocean steamers; and Philadelphia has an extensive foreign commerce. The docks are located along the river front, and here most of the wholesale trade is conducted. The city is also an important receiving and distributing center for those portions of the country reached by the divisions of the Pennsylvania, the Baltimore & Ohio and the Philadelphia & Reading railroads.

HISTORY. The first settlement was made in 1636 by Swedes and was named Wicaco. The first English settlement was made in 1681 under Captain William Markham, who came to the country as deputy governor under William Penn. The colony grew rapidly, and within four years it had over 2500 inhabitants, most of whom were Quakers. A few Germans also settled in Germantown, now within the city limits, and the influence of these two classes affected the life of the city for many years. The city was chartered

in 1701. During the Revolutionary period Philadelphia was the center of political activity and the capital of the colonies. It was occupied by the British for nearly a year, from September, 1777, to June, 1778. After the close of the war it was the national capital until 1800, and from 1755 until near the middle of the nineteenth century it was the chief city in wealth, commerce and culture in the country. With the completion of the Erie Canal, in 1825, New York received advantages that attracted to her harbors much of the commerce that formerly came to Philadelphia. Consult Repplier's *Philadelphia: the Place and the People*, and Rhodes's *The Story of Philadelphia*. Population in 1910, 1,594,008.

Philæ, *fil'e*, a small island in the Nile, on the borders of Nubia and Egypt, just above the first cataract and about 5 mi. s. of Assuan. It contains some remarkable ruins, among which are obelisks, temples and monuments. The most ancient of the temples was erected by Nectanebo II, about four centuries B. C. There is a great temple to Isis, to whom the island was especially sacred. The great dam, which has been built a short distance below Philæ, threatens the existence of the ruins.

Philemon. See BAUCIS AND PHILEMON

Philip, *fil'ip*, one of the twelve apostles, a native of Bethsaida, the city of Andrew and Peter; called to follow Jesus at Bethany. After the resurrection he was present at the election of Matthias to the apostleship, but he is not again mentioned. In the Western Church he is commemorated on May 1.

Philip, the Evangelist, often confounded with Philip, the apostle, is first mentioned in *Acts* vi, 5. He preached at Smyrna, where Simon Magus was one of his converts; he baptized the Ethiopian eunuch, and he entertained Paul and his companion on their way to Jerusalem. Philip had four daughters who had the gift of prophecy.

Philip II, **AUGUSTUS** (1165-1223), king of France, was crowned during the lifetime of his father, Louis VII, whom he succeeded in 1180. One of his first measures was the banishment of the Jews from the kingdom and the confiscation of their property. He joined Richard I of England on a crusade to the Holy Land, but soon quarreled with him, returned to France and invaded Normandy during Richard's captivity. After the accession of John to the English throne, Philip continued the struggle with England, confiscated the possessions of John in France and prepared to invade England at the instance of

the pope. John allied himself with Germany and Flanders, but Philip gained a great victory at Bouvines.

Philip IV, called *the Fair* (1268-1314), king of France, succeeded his father, Philip III, in 1285. He had already married Joanna, queen of Navarre, and by this alliance he added Champagne, as well as Navarre, to the royal domain, which he made it his policy still further to increase at the expense of the great vassals. He was long engaged in war with Flanders, which resulted in the accession of the Walloon territory to France and the restoration of the rest of Flanders to its count, on condition of feudal homage. One of the chief events of the reign was the struggle with the pope, which resulted in the seizing and imprisonment of the pope, the appointment to that office of an adherent of Philip and the removal of the papal residence to Avignon. Philip left numerous ordinances for the administration of the kingdom, which mark the decline of feudalism and the growth of the royal power. He also convoked and consulted the States-General for the first time.

Philip VI (1293-1350), king of France, the first of the dynasty of Valois. He succeeded to the crown in 1328. In his reign occurred the wars with Edward III of England, who claimed the French crown as grandson of Philip IV. His reign was unfortunate for France, by reason of the inauguration of this long war, known as the Hundred Years' War; and Philip left an evil memory by his persecutions of Jews and heretics and by his confiscations and exactions.

Philip II (1527-1598), king of Spain, the son of Charles V and Isabella of Portugal. He was married first to Maria of Portugal, and on her death, to Mary of England. In 1555 his father resolved to abdicate the sovereignty of the Netherlands in Philip's favor; and in 1556 Philip received the crown of Spain, with its possessions in Asia, Africa and America. His first act was to propose a truce with France, which was broken almost as soon as concluded. In 1556 he went to England, where he was refused the ceremony of a coronation as well as the troops that he demanded in aid of his war with France. These, however, were at length conceded to him by Mary. By the Treaty of Câteau-Cambrésis in 1559, the French war was concluded in a manner favorable to Spain, but from this time Philip's fortunes began to decline. In 1566 began the revolt of the Netherlands, which ended in the separation of the seven northern provinces from the crown of Spain and their formation into the

Dutch Republic. This struggle lasted about thirty years, till the close of Philip's reign. In 1580 the Spanish troops under Alva subdued Portugal, of which, with all its dependencies, Philip now became sovereign. The year 1588 saw the destruction of the Armada and the descent of Spain from her position as a first-class power in Europe. The remainder of Philip's reign was occupied with war and intrigues with France, but in 1598 the Peace of Vervins was concluded. Philip showed some disposition at the same time to make peace with England and the Netherlands, but his offers were not accepted.

Philip V (1683-1746), king of Spain, the first Spanish king of the Bourbon dynasty. He succeeded to the crown of Spain by the will of Charles II, who died without direct heirs. On the death of Charles, in 1700, he was immediately proclaimed king and was generally recognized in Spain, Naples and the Netherlands; but the succession was contested by the archduke Charles of Austria, whose claim was enforced by the armies of England, Holland and Austria in the wars of the Spanish Succession, which began in 1702. By the Treaty of Utrecht (1713) Philip was recognized as king of Spain, but Gibraltar was lost to Spain, Minorca was ceded to England, Sicily to Savoy and the Netherlands and Naples to Austria. Philip married Elizabeth Farnese in 1714, and Alberoni, the favorite of Elizabeth, became prime minister; by his ambitious plans he brought upon Spain war with the other European powers. In 1724 Philip resigned the crown in favor of his son Louis, but the death of Louis a few months later induced him to resume the royal power.

Philip II (382-336 B. C.), king of Macedon, son of Amyntas II and father of Alexander the Great. He succeeded his elder brother Perdiccas in 360. His position at first was not very secure, but as he had few scruples and was a man of the highest talents, both for war and diplomacy, in a short time he had firmly established himself, had reorganized the Macedonian army and had begun to extend his sway beyond his own kingdom. The terror of his name provoked the *Philippics* of Demosthenes, who endeavored to rouse the people of Athens to form a general league of the Greeks against him; but by 346 he was master of the Phocian cities and of the pass of Thermopylae, and as general to the Amphictyonic council he was the protector of the Grecian faith. In the execution of the duties of his office he marched into Greece to punish the Locrians for an act of profanity; but instead he

Philip

seized the city of Elatea and began to fortify it. Demosthenes now exerted all his eloquence and statesmanship to rouse the ancient spirit of Grecian independence, and a powerful army was soon in the field, but as it was without able or patriotic commanders, it was defeated at the decisive Battle of Chaeronea, 338 B. C. After this last struggle for freedom Philip was acknowledged chief of the whole Hellenic world, and at a congress held at Corinth he was appointed commander of the Greek forces for the projected expedition against Persia. While preparing for this enterprise he was murdered.

Philip, KING. See KING PHILIP.

Philippine, fil'ip in, Islands, a group of islands in the Pacific Ocean, occupying the Philippine Archipelago and situated between $4^{\circ} 30'$ and $21^{\circ} 30'$ north latitude, and 116° and 127° longitude east from Greenwich. The Philippine Archipelago, as bounded by the Treaty of Paris, has a length from north to south of about 1000 miles and a width from east to west of about 600 miles. The area is 115,000 square miles, or about the same as the combined areas of Nevada and Connecticut. Within this are grouped over 3100 islands, over 1600 of which are named. The rest are mere points of land and are designated by number or simply by location. No accurate survey of the archipelago has yet been completed. The ten largest islands, with their respective areas and populations, are given in the following table:

ISLAND	AREA IN SQUARE MILES	POPULATION IN 1910
Mindanao	45,559	499,634
Luzon	43,075	3,798,507
Samar	5,198	222,690
Negros	4,839	460,776
Panay	4,752	743,646
Palawan	4,368	10,918
Mindoro	4,050	28,361
Leyte	3,872	357,641
Cebu	1,668	592,247
Bahol	1,400	243,148

Of these, Luzon, though second in size, is by far the most important. This island has a length of about 425 miles and an extreme width of 140 miles. Mindanao measures about 300 miles in its greatest extent from east to west, and a little less from north to south.

SURFACE AND DRAINAGE. The Philippine Islands rest upon an oceanic plateau, which within the archipelago is seldom lower than 200 feet beneath the surface. The islands consist of uplifts on this plateau and are mostly of volcanic origin, though coral formations have added somewhat to the original area of the volcanic is-

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lands. The large islands are all mountainous. In the main the mountains extend in north and south directions and contain numerous volcanic peaks. About 50 of these are well marked, and of this number over 20 have been active within historic times; a few are now active or quiescent. The highest peak is Mount Apo, in Mindanao,



10,312 feet. On this island and Luzon there are a number of other peaks which exceed 7000 feet, including Halcon, 8868 feet, and Mayon, 8274 feet, both on Luzon. Along the coast of Luzon and Mindanao there are quite extensive tracts of low land, and some of the smaller islands, which are of coral formation, rise only a few feet above the sea. With scarcely an exception the islands are irregular in form, and this gives them a coast line which exceeds that of the United States.

Luzon and Mindanao are the only islands that have rivers of any considerable importance. The chief rivers of Luzon are the Rio Grande de la Pampanga, flowing into Manila Bay; the Cagayan, draining the northern part of the island, and the Pasig, connecting Laguna de Bay with Manila Bay. Though short, this stream is of great commercial importance. The largest river in the islands is the Rio Grande de Mindanao,

which drains the north and central parts of Mindanao and flows into Celebes Sea. The islands contain but few lakes of importance. Of these Laguna de Bay, near Manila, and Laguna de Bombon, also in Luzon, are the best known.

CLIMATE. Although the islands lie wholly within the tropics, their extent from north to south and their variation in altitude give them a great variety of climatic conditions. While they have a hot climate, the heat is not so intense as might be supposed from their latitude. The range of temperature is usually between 60° and 90° for different seasons of the year, the thermometer seldom falling below the former or rising above the latter point. The year is usually divided into three seasons. The first, extending from the middle of November to the middle of March, is the most agreeable. From the middle of March to the middle of July is the hot, dry season, and from the middle of July to the middle of November is the rainy season, in which the temperature is seldom higher than it is during the winter. That portion of the archipelago north of the tenth parallel of latitude is affected by the trade winds, which begin in April or May and blow for about five months. These are followed by the northeast monsoon, which continues the remainder of the year. The islands are also visited by frequent typhoons, which are the strongest at about the equinoxes. These pass over the islands from west to east and frequently do considerable damage (See **TYPHOON**). As in other tropical regions unaffected by large mountain ranges, the rainfall is heavy, but it is unevenly distributed throughout the year.

MINERAL RESOURCES. The variety and extent of mineral resources are not fully known. Coal similar to that mined in Japan is found quite generally distributed throughout the islands and is mined by the government for use on transports. Gold has been known to exist in Luzon for some centuries, and during all of this time placer mines have been worked by the natives, though the amount obtained has been small; from an American point of view, the gold mines do not seem to be of great value. There are also large deposits of copper and of iron ore in the central and northern parts of Luzon, and it is probable that a systematic survey of the other large islands will lead to the discovery of similar deposits. Petroleum has been found in the island of Panay.

VEGETATION. About 80,000 square miles of the islands are covered with forests, which contain many varieties of hard and soft woods com-

mon in this part of the world. Among these are found gutta-percha and various species of palms, such as cocoanut, nipa and calamus. The last two are extensively used for building and domestic purposes. This forest area is directly under the control of the bureau of forestry of the Philippine government, which, through authorized agents, prevents wasteful cutting of the trees and holds the land so that large areas cannot be obtained by companies seeking to gain a monopoly of the lumber industry. Bamboo, which is of very great value to the natives, is found throughout the islands, and abacá, or Manila "hemp," grows wild in some sections. There are many species of tropical plants, noticeable for their brilliant flowers or for various economic uses.

ANIMAL LIFE. The islands have over sixty species of mature mammals. Some species of wild cats and civets are found; there are also bats, the most interesting of which is the flying fox, or fruit bat. One species of monkey is found, also a flying lemur. There are rats, squirrels and other small rodents. A native buffalo, called the timarau, is found in the forests of Mindoro. The water buffalo, or carabao, has been domesticated and is the chief beast of burden, and wild hogs are found in all of the large islands. The islands contain several species of deer, some of which have been domesticated. The domestic animals common to Europe and the United States have been introduced. Among these are a small horse, swine and sheep. Some humped cattle are found in various localities, and the breeds of cattle common in Europe and the United States have been introduced. Of birds, there are nearly 700 species. More than half of these are peculiar to the Philippines. The cockatoo and numerous species noted for their plumage are found. The largest reptiles are the python and the crocodile. Lizards are numerous, and are found in almost endless variety. The inland and coast waters contain numerous species of fish valuable for food, and the pearl oyster exists along the coasts in such numbers as to make fishing for its shell a profitable industry.

INDUSTRIES. Agriculture is the most important industry of the islands, yet it is carried on in a very primitive manner, and only a small portion of the tillable land is under cultivation. The soil and climate are well adapted to growing nearly all crops of the tropical regions. At present the chief crops are rice, Manila "hemp," sugar cane, tobacco and cacao. Coffee was formerly raised, but the crop has become unprofit-

able, on account of destructive insects. Hemp is extensively cultivated in some quarters, but a portion of that exported grows wild. With the introduction of modern methods of agriculture this crop can be made one of great value.

There are but few manufactures in the islands. Chief among these is the manufacture of cigars and other tobacco products. The natives are very skilful in the manufacture of textiles, and from the finest of the hemp fiber they produce fabrics remarkable for their lightness and softness, but these are seldom sent to foreign countries. The heavier textiles are sometimes exported. All these are manufactured on hand looms, and in both spinning and weaving the most primitive implements are employed. The manufacture of mats, bags, rope, leather and sugar is of some importance. Some of the tribes also show skill in wood carving and in the manufacture of furniture, and others are proficient in the making of edged tools, some of which have their blades highly ornamented.

TRANSPORTATION. Until 1905 there was but one railroad in the islands. This extended from Manila northward 120 miles to Dagupan. At present railroads are in operation from Manila to Cabanabuan and to Antipolo, while others are already projected under government direction. In general the roads are very poor, and but few of the streams are navigable, but the insular government uses a portion of its income each year in constructing highways. All of the larger islands have been connected by telegraph, and Manila is connected with the United States by the American Pacific Cable and with the leading ports of Asia and Europe by other cables. A good postal system, based on that of the United States, is also in operation. While the facilities for transportation and communication are still inadequate, they are being rapidly improved, and with their improvement will come an increase of commerce, which naturally follows the development of transportation facilities. At present the only means of transporting commodities from the interior of the islands is by native carts or by pack animals.

COMMERCE. The commerce of the islands has never been large, but has increased quite rapidly since the American occupation. Manila, the chief seaport, has been opened to admit the largest ocean steamers, by the dredging of the bay and the construction of a new dock. Cavite and Dagupan, on Luzon, are also of considerable commercial importance, while Cebu, on the island of Cebu, and Iloilo, on Panay, are the most important ports in the central islands. The

exports are hemp, which far exceeds all other articles in value; sugar, tobacco, copra (the dried meat of the cocoanut), and a limited amount of manufactures. The imports consist largely of manufactured goods and foodstuffs. The chief trade is with Great Britain, the United States and Spain. The annual exports are over \$50,000,000, and the imports are about \$40,000,000. From the tariff on imports and from internal taxes, the revenue for support of the government is derived. The coin in general use is the *peso*, valued at 50 cents in United States money.

INHABITANTS AND LANGUAGE. The native people consist of the Negrito tribes, generally considered aborigines, numbering between 20,000 and 30,000, and the Malay tribes, of which there are a large number. The Negritos are the eastern negroes. They have curly hair and nearly black skin and are short of stature. They dwell in the interior and are still in a state of savagery. In addition to these are the Igorrotes, occupying the central provinces of northern Luzon, a Malay tribe who are still in an uncivilized or partially civilized state. In general the term *Filipino* includes the seven Christianized tribes, of which the Tagalogs, Visayans, Bicol and Pampangans are the most important. These tribes occupy nearly all of northern Luzon, the central islands and the northern part of Mindanao. Among them are found all grades of culture, from the barbarian to the college-educated man, but the larger portion of them are civilized. The Moros occupy a large part of Mindanao and the Jolo Archipelago. The total population of the islands, as estimated in 1912, is 8,460,052.

There are nearly as many dialects in the islands as there are tribes, and no one dialect or language predominates, even in the island of Luzon; consequently, ever since Spanish occupation it has been necessary to use a foreign language as the official language of the islands. This was naturally Spanish until after the American occupation, but on Jan. 1, 1911, English became the official language of the government and the courts. The Tagalog, or Tagal, and Visayan dialects are the most fully developed of the native tongues, and these have reached such a stage of completion as to lead to the development of a limited native literature.

The people generally live in villages or cities, and are retiring and simple in their habits. They have the lethargy common to native peoples of tropical climates; yet, when sufficient inducement is offered, they have proved willing and efficient workers. Little dress is needed to protect them

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from these elements, hence their attire is scanty. Their houses are constructed of bamboo; the floors are built about five feet from the ground, and the roofs are covered with nipa or some other form of thatch. Their culinary utensils and articles of furniture are of the simplest sort.

By far the larger part of the civilized Filipinos are followers of the Roman Catholic faith. The Moros, as the name indicates, are Mohammedans. The uncivilized tribes practice various religious rites of a heathen nature. There are, however, natives who are followers of the leading Protestant denominations, but these churches have as yet only a slight hold in the islands.

GOVERNMENT. The executive government consists of a governor-general, vice-governor-general and six other commissioners appointed by the president of the United States with the advice and consent of the Senate. Formerly the commissioners were all Americans; later first one, then two, and now a majority are native Filipinos. The commission, each of whose members is the head of a department, also constitutes the upper house of the legislature; the lower house consists of a native assembly chosen by qualified voters. This assembly is limited to 100 members.

The islands are divided into provinces. The affairs of each province are in the hands of a governor, treasurer, superintendent of schools, district engineer, attorney and an elective official; the governor, treasurer and elective official form the provincial board. When these provincial governments were established, the governor was appointed by the commission. He is now elected by the provincial assembly, which is composed of the members of the town councils and organized municipalities. The elective official is also elected by the provincial assembly. The provinces are divided into pueblos, or townships, and these are governed as municipalities. It was in the erecting of these municipalities that the commission took the first step toward instituting local self-government. The president and vice-president of the municipal council are elected, though the privilege of voting is restricted to the male inhabitants who hold some municipal office, have property of the value of at least \$250, pay taxes to the amount of \$15 and can read, write and speak Spanish or English.

The courts have been reconstructed on the American plan, and consist of a supreme court, with one chief justice, who is a native Filipino, and six associate justices, and a series of courts of first instance, presided over by native justices,

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besides municipal courts and courts of the justices of the peace. The courts of first instance are courts of record and have original jurisdiction in cases considered too important to be tried in the municipal or justice courts.

EDUCATION. The system of education is under the management of a superintendent of education, and public schools on the American plan have been established in all of the large islands. Immediately after the establishment of civil government, a thousand teachers were imported from the United States. The larger number of these have given their attention to the work of supervision and to the preparation of Filipinos for the work of teaching. A normal school is maintained at Manila, and the provinces constitute districts for supervision. Marked progress in elementary instruction is being made. The natives have manifested an eager desire for education and, especially, for learning the English language. Such has been the demand that the appropriations and facilities for supplying it are inadequate, and large numbers of children are yet unable to secure school privileges. These conditions are being remedied as rapidly as possible. English is the language taught and used in the schools.

CITIES. The chief cities are Manila, the capital; Cavite, Dagupan, Iloilo and Cebu, each of which is described under its title.

HISTORY. Magellan discovered the islands in 1521 and lost his life battling with the natives. After several ineffectual attempts at settlement by the Spaniards, the first colony was established in 1565 on the island of Cebu. From this foothold the Spaniards proceeded to occupy one island after another, until they had obtained control of nearly the entire archipelago. The occupation was followed by the work of the religious orders, who established missions among the natives and used every effort to convert them to Christianity. During the seventeenth century the islands suffered somewhat from the war between the Dutch and the Spanish, and in 1662 they were raided by Chinese pirates. Following this, for a period of a century the islands were left without disturbance. Because the main object of the occupation was to Christianize the inhabitants, and also because of opposition of Spanish merchants, no attempt was made to exploit the islands or in any way to develop their commerce. In the Seven Years' War the islands were captured by the British, but they were retroceded to Spain by the Treaty of Paris, in 1763. They then remained under Spain's control until the

outbreak of the Spanish-American War in 1898, when the Spanish fleet was destroyed by the American squadron under Commodore Dewey on May 1. On August 13 Manila was captured and the islands came under American occupation. By the Treaty of Paris, which closed this war, the Philippines were ceded to the United States, on the payment to Spain of \$20,000,000.

Previous to the outbreak of the Spanish-American War, there had been an insurrection in the islands, under the leadership of Emilio Aguinaldo and others. While the insurrection had been quelled by the Spanish authorities, the captain-general decided that the best means of pacifying the malcontents was to pay the leaders a large sum, on agreement that they should leave the islands, never to return. About one-half of this amount, \$200,000, was paid to Aguinaldo and some others, who departed for Hong Kong. However, when the war broke out, Aguinaldo returned to Manila, and a short time after he proclaimed the Filipino Republic.

Aguinaldo and his troops assisted the American army in the investment of Manila and contributed no small part towards the capture of the city. He claimed that he had obtained from Dewey and certain American consuls a promise that the United States would hold the Philippines until an independent government could be established, treating these islands in the same way that Cuba was treated. These officers, however, denied that any such promise had been made, and when the islands were ceded to the United States, Aguinaldo instituted a revolt against American authority. This brought on a war which, beginning in 1899, lasted for more than two years; it is generally known as the Filipino Insurrection. In January, 1899, President McKinley sent the first commission to the islands to learn the state of affairs and to try to pacify the leading Filipinos and secure their allegiance to the government.

In 1900 a Philippine Commission, with Hon. William H. Taft at its head, was appointed, and in July, 1901, this commission established civil government throughout the islands, and Judge Taft became civil governor. In 1902 arrangements were completed by Taft for the purchase of the lands owned by the Catholic friars who had been forced to flee from the islands, and in the next year a census was taken. Following Taft the governors-general in order were Gen. Luke E. Wright, H. C. Ide, and Gen. James T. Smith. During the administration of Gen. Smith, the first Philippine Assembly was

opened on July 30, 1907. Under W. Cameron Forbes, governor from 1909 to 1913, great progress was made, especially in the matters of health and education. For the remarkable advances made in the improvement of health conditions and in the elimination of small-pox and other epidemic diseases, the chief credit must go to Dr. Victor G. Heiser, the director of health.

In 1913 Francis Burton Harrison was appointed governor-general by President Wilson. The administration, in the words of the president, is pledged to secure "the ultimate independence of the islands." The first step towards this end was the appointment of a majority of natives as members of the Philippine Commission. It was also announced as the government policy to appoint native Filipinos to most offices previously held by Americans. These changes are being gradually effected and unless the present policy is reversed it seems that the Philippine Islands will be independent not later than 1921.

Philistines, *fil is'tinz*, the name of a Semitic people or race who inhabited the southern part of the lowlands of Palestine, from the coast near Joppa to the Egyptian desert south of Gaza. Their five chief cities formed a kind of confederacy under five lords, or chiefs. They are frequently mentioned in the Bible as the enemies of the Hebrews.

Phillips, WENDELL (1811-1884), an American orator and reformer, born at Boston, Mass., the son of the first mayor of the city. He graduated at Harvard in 1831, studied law there and was admitted to the bar in 1834. But before clients came, he had been drawn away from his profession to the work of pleading for the abolition of slavery. A speech in Faneuil Hall in 1837 against the murderers of Lovejoy at Alton, Ill., made him at once the principal orator of the anti-slavery party; and henceforth, until the president's proclamation of Jan. 1, 1863, he was a leader in the struggle, his lectures and addresses doing more for the cause than can be estimated. He also championed the cause of temperance, of women's rights, of the Indians, of prison reform and of labor. In 1870 he was nominated for governor by the Prohibitionists and the labor party. He was long a conspicuous lyceum lecturer, his elegant, polished oratory and manner making him extremely popular. His addresses on *Toussaint l'Ouverture*, *The Lost Arts* and *The Scholar in a Republic* are notable examples of his power. (See illustration on next page.)

Phillipsburg, *fil'lips burg*, N. J., a town in Warren co., 60 mi. w. of Newark, on the Lehigh Valley, the Pennsylvania and several other railroads and on the Delaware River, opposite Easton, Pa. It has good water power and excellent transportation facilities and contains foundries, furnaces, railroad shops, horseshoe factories, sheet iron works, silk mills, large coal yards and other establishments. It was settled in 1749 and was incorporated in 1861. Population in 1910, 13,903.

Philology, *fil ol'o jý*, or **Comparative Philology**, terms commonly used to mean the science



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of language, otherwise called *Linguistic Science*, or *Linguistics*. This science treats of language as a whole, of its nature and origin, and of the different languages of the world in their general features, attempting to classify and arrange them and to settle in what relationship each stands to the others. That every language has a life and growth is true in a sense, for languages are continually in a state of change.

A language is a system of vocal sounds, through which ideas are conveyed from person to person, in virtue of the fact that certain ideas are attached to, or belong to, certain sounds by a sort of general understanding existing among those who use the

language. That there is any natural law by which one idea belongs to one vocal sound rather than to another can hardly be affirmed, in view of the fact that if we select any one idea, we shall find that each of the thousand languages of the world expresses this idea by a different sound or group of sounds. Indeed, ideas can be conveyed otherwise than by vocal sounds, as witness the elaborate sign language that has been developed in some communities and the finger language of the deaf and dumb.

As to the origin of language, nothing is really known. We suppose that the earliest men had no language, but having suitable organs for speech they devised a language among themselves as a means of intercommunication. We may conclude that the earliest attempts at speech were either in imitation of the different sounds heard in nature or that they were based on the inarticulate utterances or cries by which human beings naturally gave vent to different emotions. However language originally arose, it is very certain that whatever language we speak has to be acquired from others who have already learned to speak it, and that those others have similarly acquired it from their predecessors, and so on backward into the darkness of the remotest ages. Every language is thus at our birth a foreign language to all of us.

The science of philology is of modern origin, being hardly, if at all, older than the nineteenth century. Already most valuable results have been attained and a large number of languages have been studied and classified; yet much remains to be done, and much remains uncertain and must always remain so.

One great difficulty that the philologist has to grapple with is that only a very few tongues possess a literature dating from before the Christian era and that the greater number have no literature at all.

Philology has succeeded in showing that the English language is one of a group of closely allied languages, which are known by the general name of the Teutonic, or Germanic, tongues. The other languages of the group, some of which are more closely connected with English than the rest, are Dutch, German, Danish, Icelandic, or Old Norse, Swedish and Gothic; to these may be added, as of less importance and having more of the character of dialects, Norwegian, Frisian, Plattdeutsch, or Low German of northern Germany, and Flemish, which differs little from Dutch. The Teutonic tongues are often divided into three sections, based on closeness of rela-

tionship—the High German, of which the modern classical German is the representative; the Low German, including English, Dutch, Frisian, Plattdeutsch and Gothic, and the Scandinavian, including Danish, Swedish and Icelandic. Another division is into East Germanic, including Gothic and Scandinavian, and West Germanic, including the others.

The evidence that all these languages are closely akin is to be found in the great number of words that they possess in common, in the similarity of their structure, their inflections, their manner of compounding words—in short, in their family likeness. This likeness can be accounted for only by supposing that these languages are all descended from one common language, the primitive Teutonic, which must have been spoken at a remote period by the ancestors of the present Teutonic peoples, there being then only one Teutonic people as well as one Teutonic tongue. In their earliest form and when they began to be differentiated, these languages must have had the character of mere dialects, and it is only in so far as each has had a history and literature of its own that they have attained the rank of independent languages.

The rise of dialects is a well-known phenomenon, taking its origin in the perpetual change to which all languages are subject. A language that comes to be spoken over a considerable area and by a considerable number of persons—especially when not yet firmly fixed by writing and literature—is sure to develop dialects, and each of these may in course of time become unintelligible to the persons using the others, if the respective speakers have little intercourse with each other. In this way is the existence of the different Teutonic tongues to be accounted for. A similar instance of several languages arising from one language is seen in the case of Italian, French, Spanish and Portuguese, all of which are descended from the Latin. Of the common origin of these, we have, of course, direct and abundant evidence.

The Teutonic tongues, with the primitive or parent Teutonic, from which they are descended, have been proved to belong to a wider group or family of tongues, which has received the name of Aryan, Indo-European, or (especially in Germany) Indo-Germanic family. The chief members of this family are the Teutonic; Slavonic (Polish, Russian, Lithuanian); Celtic (Welsh, Irish, Gaelic); Italic, or Latin; Hellenic, or Greek; Indic, or Sanskrit; Iranic, or Persian, and Anatolic, or Armenian. Just as the Teutonic

tongues are believed to be the offspring of one parent Teutonic tongue, so this parent Teutonic and the other members of the Aryan family are all believed to be descended from one primitive language, the Aryan, or Indo-European, parent speech. The people who spoke this primeval Aryan language, the ancestors (linguistically at least) of the Aryan races of Europe and Asia, are believed by many to have had their seat in central Asia, to the eastward of the southern extremity of the Caspian Sea. This, however, is very problematical, and some philologists see reason to think that Europe may have been the original home of the Aryans. This latter view is now perhaps the one most generally held.

How remote the period may have been when the ancestors of the Teutons, the Celts, the Slavs, the Greeks, the Romans, the Persians and the Hindus were living together and speaking a common language, is uncertain. Yet the general character of their language is approximately known, and philologists tell us with some confidence what consonant and what vowel sounds the Aryan parent speech must have possessed, what were the forms of its inflections, and what, at the least, must have been the extent of its vocabulary, judging from the words that can still be traced as forming a common possession of the sister tongues of the family.

The Aryan tongues, ancient and modern, are entitled to claim the first rank among the languages of the globe, as to richness, harmony and variety, and especially as embodying a series of literature to which no other family of tongues can show a parallel. Next in importance come the Semitic tongues—Hebrew, Chaldee, Syriac, Arabic and their related languages. These, like the Aryan tongues, form a well-marked family, one notable peculiarity of which is the possession of “trilateral” roots, or roots of which three consonants form the basis and give the general meaning, while inflection or modification of meaning is indicated by internal vowel-change. Thus the vowels play a subordinate part to the consonants and do not, as in the Aryan tongues, associate with them on equal terms.

Other important linguistic families are the Hamitic, which includes ancient Egyptian, Coptic, Berber and Ethiopian; the Turanian, or Scythian, which includes Turkish, Finnish and Mongolian, and the Southeastern Asiatic, which includes Chinese and Siamese. Other families of languages are the Malayo-Polynesian, of the Indian Archipelago and the Pacific; the Bantu, a great family of South Africa, and the American

indian languages, which are characterized as polysynthetic from the way in which they crowd as many ideas as possible into one unwieldy expression. All these families form groups, so far as is known, separate from and independent of each other; and attempts to connect any two of them, as Aryan and Semitic, for instance, have met with little success. Formerly, etymologists had no hesitation in deriving English words from Hebrew roots, but this was in the days when there was no science of comparative philology. That all languages are descendants of one original tongue, as believed by many, linguistic science can neither affirm nor deny. We may add that community of language is not a proof of community of race, since it is well known that, as the result of war or otherwise, races have given up the language that once belonged to them and adopted some other.

Philomela, *fil'o me'la*, in Greek mythology, a daughter of Pandion, king of Athens, who, being violated and deprived of her tongue by Tereus, the husband of her sister Procne, made known her wrong to the latter by embroidering it in tapestry. In revenge, the sisters murdered Itys, the son of Procne by Tereus, and served him up to his father. They then fled, and Tereus pursued them, but they were changed by the gods into birds, Philomela into a nightingale, Procne into a swallow and Tereus into a hawk.

Philosopher's Stone. See ALCHEMY.

Philosophy, *fil os'o fy*, (from the Greek *philos*, friend, and *sophia*, wisdom). According to the present use of the term, philosophy is the science which deals with speculation upon the final reality of things and upon the validity of the general concepts and principles underlying all branches of scientific knowledge. The scope of philosophy has been somewhat narrowed by the growth of the natural sciences and by the development of psychology, ethics and logic as distinct branches (See PSYCHOLOGY; ETHICS; LOGIC).

A knowledge of the history of philosophy is essential to an understanding of the subject, but only a brief outline of such history is possible in a brief article. History considers philosophy to begin with the Milesian school, founded by Thales about 600 B. C. Thales and his followers adopted many of the notions of the orientals, added their own ideas to these and attempted to arrange the whole into a system. This school attempted to discover a world-substance, from which all forms of nature are derived. This substance Thales considered to be water. His immediate successor considered it to be an inde-

structible, imperceptible substance, and still another believed it to be air.

The period of ancient Greek philosophy extended to about 500 A. D., or during eleven hundred years. It was divided into three minor periods. The philosophers of the first of these periods gave their attention almost entirely to the discovery of the material and laws relating to the origin and formation of the universe. The second period was characterized by the teachings of Socrates and his followers, who directed man's attention upon himself and proceeded to formulate certain rules of conduct by which man should be governed. During this period the sophists and cynics arose (See SOPHISTS; CYNIC SCHOOL OF PHILOSOPHY). The third period is characterized by the systems of Plato and Aristotle, whose theories were more idealistic than those of their predecessors. Plato asserted that the one eternal reality consists in a unity of ideas in an all-embracing and entirely good Idea, or God. Aristotle, anticipating modern methods of investigation, treated philosophy as an inductive science and proceeded from known facts to general truths (See CONCEPT; INDUCTIVE METHOD). This period was also characterized by Cynicism, Stoicism and Epicureanism, each of which is explained under its proper title.

The Romans borrowed their philosophy from the Greeks, selecting such portions of each system as they thought best suited to their needs, and thus constructing an eclectic system. During the Middle Ages the Schoolmen tried to harmonize Aristotle's system of logic with the fundamental tenets of the Church (See SCHOLASTICISM). Descartes (1596-1650) was the first great modern philosopher. He rejected the doctrine of Scholasticism and made the existence of individual reason the starting point of his system. He also made a complete distinction between mind and matter, and recognized God as the absolutely perfect being. From these and other general truths he proceeded to individual facts (See DEDUCTIVE METHOD), and he was the greatest modern advocate of deductive philosophy. Bacon, the founder of the modern inductive method, lived at the same time as Descartes, and to these leaders modern philosophy owes its foundation. See BACON, FRANCIS; DESCARTES, RENÉ.

The systems formed by later philosophers are the modification of the systems established by these men or by the philosophers of ancient times. The growth of the scientific spirit since the seventeenth century has lent influence to the

Phlox

inductive method, and the development of mathematical science has emphasized the deductive.

During the eighteenth and the early part of the nineteenth centuries many attempts were made to harmonize the spiritual and material elements in the universe, but most of the theories were complicated, and they have been discarded. These theories are of no interest except to the student of philosophy. Since the middle of the nineteenth century philosophy has taken a more practical turn. Among the German philosophers Hegel, Herbart and Lotze have had the greatest following, both in their own country and in England and the United States. Of the English philosophers John Stuart Mill, the founder of the Utilitarian School (See UTILITARIANISM), Darwin and Herbert Spencer have been the most influential in shaping philosophical thought. Skepticism and sensationalism have to quite an extent characterized the French theories. The only school of note established in the United States was that of the Transcendentalists, in which Ralph W. Emerson was prominent (See TRANSCENDENTALISM). Among American philosophers of note are Jonathan Edwards, Franklin, Bowen, Ladd, William James, Dewey, Ross, William T. Harris and the leaders of the Transcendental school. In addition to the articles already referred to, see METAPHYSICS; PSYCHOLOGY.

Phlox, *flops*, a genus of herbs, natives for the most part of North America, though some of the species are to be met with in Asia. The flowers, which are favorites in gardens, are of a purple or violet color, more rarely white or red. The trailing kinds are excellent for rock work. Some of the well-known wild species are the bluish *sweet-william* of the Central and Southern states, the *creeping pink* of the South, the lilac-tinted variety of the East and Drummond's phlox, commonly cultivated in gardens.

Phocion, *fo'she on*, (about 402-317 B. C.), an Athenian general, one of the most virtuous characters of antiquity. During the war with Philip of Macedon, the Athenians sent Phocion with troops to Euboea, where he obtained a complete victory over the enemy. Some time later he was dispatched to assist the cities of the Hellespont against Philip, whom he compelled to retire. Despite this fact, however, he believed that it was for the good of Greece to submit to Philip, and when Alexander later demanded the surrender of Athens, Phocion advised the city to give in to his demands.

Phoenicia

Phoebe, *je'be*, or **Pewee**, a little olive-green bird of the tyrant flycatcher family, very common in America and named from its call. It builds its compact little nest under bridges, on the



PHOEBE

beams, very near the water. It is a well-constructed nest, lined with cotton or some soft substance. Two broods are raised in a season, and when summer is over the birds migrate to the South. See KINGBIRD; WOOD PEWEE; also, works on American ornithology.

Phoenicia, *jee nish'e ah*. GEOGRAPHY. Phoenicia is the name given by the Greeks to the little strip of broken coast between the Mediterranean Sea and the Lebanon Mountains. In the Old Testament this region is called Canaan, and the inhabitants, Sidonians. The land is barren and rocky, but the harbors are good. Of the once famous "Cedars of Lebanon," but few remain.

PEOPLE. The Phoenicians, who were a Semitic people, akin to the Israelites, were the first great colonizing and commercial people of antiquity. They were, moreover, ingenious, and were noted for their improved alphabet (See ALPHABET) and their knowledge of the art of writing, for their skill in mining, in building and in casting metals, and for their manufacture of glass, of cloth and of purple dyes. Like the people of most commercial cities, they were lovers of peace and fond of luxury. Their religion resembled that of the Assyrians, but was even more cruel and debasing. Their chief deities were Astarte, the moon-goddess or goddess of love, and Baal, the sun-god, to whom it was customary to sacrifice every first-born child. They were never united under one ruler, but each city was a sovereignty in itself. Their literature seems to have been very scanty, consisting chiefly

of annals, and it has been almost entirely lost. Our knowledge of their language comes from inscriptions, coins and seals and from Greek translations.

In their art, they were not original in their conceptions, but were influenced by their neighbors, whom, however, they usually surpassed in execution. The most remarkable objects which have been preserved are the great bronze votive shields, from the cave of Zeus on Mount Ida, embossed with Egyptian sphinxes, Assyrian lions and figures of Marduk. More beautiful, in their way, are the silver dishes, found in Assyrian palaces, with their exquisite scenes from mythology, legend or daily life. The Phoenicians were also skilled workers in ivory, expert glass blowers and cunning fashioners of jewelry.

HISTORY. All the early records of the native historians are lost, but in the earliest notices that we have, dating from the fifteenth century B. C., Phoenicia was in a state of dependence on Egypt, and the towns of Sidon, Tyre, Beirut and Acre, which afterward rose to such eminence, were already in existence. About 1000 B. C. the Phoenicians planted a trading settlement at Cyprus. After Cyprus, the southern coast of Asia Minor, the islands of the Aegean Sea, the northern coast of Africa, southern Spain, Sicily and Sardinia were colonized by them. Not only did they carry on a brisk trade with these colonies, but they became the carriers of merchandise between all the markets of the world. Their vessels carried tin from England; gold, pearls and frankincense from Arabia; silver from Spain; slaves, ivory and panthers' skins from Africa; linen from Egypt; copper from Cyprus; purple from Tyre, and cunningly wrought silver and brazen vessels from Sidon.

The principal cities of Phoenicia were Tyre and Sidon, and the most important of her settlements was Carthage. Satisfied with their freedom on the sea and their commercial importance, the Phoenicians submitted easily, as a rule, to any powerful neighbor. Thus, after 850 B. C. they were in turn tributary to Assyria, Babylonia, Persia, Egypt, Greece and Rome. But the country maintained its commercial supremacy until after the capture of Tyre by Alexander, in 332 B. C.

Phoenix, *fe'niks*, a fabulous Egyptian bird, about the size of an eagle, with plumage partly red and partly golden. Of the various stories told of it by Herodotus and others, the most popular is to the effect that the bird, at an age of 500 years, conscious of its approaching death, built a funeral pile of wood and aromatic gums, which

it lighted with the fanning of its wings. On this it died, and a young phoenix rose from the ashes. The Egyptians regarded it as a symbol of immortality.

Phoenix, ARIZ., the capital of Arizona and the county-seat of Maricopa co., is in the south central part of the state, about 100 mi. n. w. of Tucson, on the Santa Fé, Prescott & Phoenix and the Southern Pacific railroads. The city is in a great irrigated valley, with mines in the near by mountains. It contains machine shops and stockyards and has a large trade in olives, oranges, honey, grain, hay and dairy products. The principal buildings are the capitol, the asylum for the insane, the courthouse, the city hall, the public library, three large banks and several fine churches and schools. The city has electric street railways, electric lights, public and parish schools, a high school, the Sacred Heart Academy, a school of music and a large United States Indian school. The place was settled in 1870 and was incorporated in 1881. Population in 1910, 11,134.

Phoenixville, PA., a borough in Chester co., about 25 mi. n. w. of Philadelphia, on the Schuylkill River, at the mouth of the French Creek, and on the Pennsylvania and the Philadelphia & Reading railroads. It contains large iron-working establishments, such as rolling mills, blast furnaces and bridge works. There are also manufactories of cotton goods, hosiery, silk and other articles. The borough has a park, a hospital and a public library, and it owns the waterworks. It was settled in 1792 and was incorporated in 1849. Population in 1910, 10,743.

Phonetics, *fo net'iks*, the science of elementary sounds of the human voice; also the art of representing these sounds by written or printed characters. In its broadest sense the term applies to all sounds of the voice, but in its restricted sense, and the one in which it is generally used, phonetics applies to articulate speech. Animals have voice, but man alone is gifted with speech. The sounds combined to form articulate speech are of two general classes, those consisting of tones produced simply by the vibrations of the vocal cords, and those in which these tones are broken up and given distinct articulation by the use of the tongue, palate, teeth and lips. The first class of sounds is represented in the English alphabet by the vowels *a, e, i, o, u, y*; the second, by consonants. Since the English language has forty elementary sounds, and there are but twenty-six letters in the English alphabet, some of these letters have to represent more than

one sound, as is the case with *a*, *e*, *i* and *g*. This arrangement makes the English language somewhat difficult for foreigners to speak and write, and various attempts have been made to simplify it. The most far-reaching of these is that known as the spelling reform, in accordance with which many leading educators and scholars sanction and use a simplified spelling of several hundred words. This simplification consists in the omission of unnecessary letters, as in the words *abridgement* (reformed spelling, *abridgment*), *adze* (reformed spelling, *adz*); in the adoption of a simpler ending in place of that used in the old form, as in *cropped* (reformed spelling, *cropt*), *cursed* (reformed spelling, *curst*); in the dropping of a final consonant or vowel in case the word ends with double consonants or vowels, as *cullass* (reformed spelling, *cultas*); in the substitution of letters which primarily represent sounds, for letters which only secondarily, or by illogical usage, represent the same sounds, as in *enough* (reformed spelling, *enuf*) or in *browse* (reformed spelling, *browz*). This movement received a notable impetus through the endowment by Andrew Carnegie of a board, composed of leading American philologists, who shall, from time to time, suggest additions to the list of amended spellings. In 1906, also, an order was issued by President Roosevelt that all government publications should use, wherever feasible, the reformed spellings as proposed by this board. This order was afterward rescinded.

Phonograph, *fo'no graf*, an instrument by means of which sounds can be permanently registered and afterward reproduced from the register. It consists essentially of a curved tube, one end of which is fitted with a mouthpiece, while the other end, about two inches in diameter, is closed with a disk, or diaphragm, of exceedingly thin metal. Connected with the center of this diaphragm is a steel point, which, when the sounds are projected on the disk from the mouthpiece, vibrates backward and forward. This part of the apparatus is adjusted to a cylinder which rotates on a horizontal axis. On the surface of the cylinder a spiral groove is cut, and on the axis there is a spiral screw of the same pitch, which works in a nut. When the instrument is to be used, a piece of tin foil is gummed round the cylinder, and the steel point is adjusted so as just to touch the tin foil. If words are now spoken through the mouthpiece and the cylinder is kept rotating, a series of small indentations is made on the foil by the vibratory movement of the steel point. These markings have an individual character of

their own, due to the various sounds addressed to the mouthpiece, and when the point is made to pass over the cylinder the second time, the words spoken into the mouthpiece are reproduced. In phonographs now in use, cylinders covered with wax have taken the place of those covered with tin foil, and in some patterns, circular disks are used in place of cylinders. The mechanism used in recording sounds also differs slightly from that used in reproducing the same sounds. Both cylinders and disks are so constructed that they can be removed quickly. They can also be sent by mail, and thus one machine may give entertainments of great variety, with little expense to the operator. The sound is strengthened by the use of a large trumpet-shaped funnel, which is attached to the enunciating disk.

Phonography, *fo nog'ra fy*. See **SHORTHAND**.

Phosphates, *fos'fayts*, in chemistry, the general name for the salts formed by the union of phosphoric acid with bases or with water, or with both. They play a leading part in animal and plant life, the most important being the phosphate of soda, the phosphate of lime and the phosphate of magnesia. Phosphate of lime forms about 57 per cent of the bones and from 80 to 90 per cent of the teeth of animals, and it appears in the other tissues and fluids. In agriculture the adequate supply of phosphates to plants is a necessity in all depleted soils. These phosphatic fertilizers consist for the most part of bones, ground bones, mineral phosphates, bone-ash and guano.

Phosphorescence, *fos for es'ens*, the property, which some substances possess, of giving off light after they have been exposed to light and then to darkness. Among the phosphorescent substances are barium, calcium, sugar and diamonds. Sometimes the phosphorescent light is brilliantly colored, and its color is known to bear a certain relation to the kind of light that fell upon it. Calcite gives an orange light after exposure to sunlight; argonite under the same circumstances gives a greenish light. Phosphorescence is a form of fluorescence (See **FLUORESCENCE**) and has nothing to do with phosphorus or with the shining of phosphorus, which is due to a chemical change.

The word is more loosely used to denote the property, which certain bodies possess, of becoming luminous without burning. In this sense, phosphorescence is sometimes a chemical, sometimes a physical, action. Certain mineral substances exhibit the phenomenon when exposed to the sun, to heat, to friction, to electricity

or to cleavage. Rain, water spouts and meteoric dust sometimes present a self-luminous appearance. Several vegetable organisms, chiefly cryptogams, exhibit this kind of luminosity; but the most interesting cases of phosphorescence occur in the animal world, the species in which the luminous property has been observed belonging to nearly every main group of the zoological series. In some of the lowest life forms and in many of the jelly fishes, the whole surface of the body is phosphorescent; in other organisms the phosphorescent property is localized in certain organs, as in the sea-pens, in certain annelids, in the glowworms and in fireflies. The phosphorescence of the sea is produced by the bodies of certain microscopic marine animals, and it is seen on the surface of the ocean at night.

Phosphoric, *fos for'ik*, **Acid**, an acid containing phosphorus, hydrogen and oxygen, usually obtained by burning phosphoretted hydrogen in atmospheric air or oxygen. It is also produced by the oxidation of phosphorus acid, by oxidizing phosphorus with nitric acid, by the decomposition of apatite and other native phosphates and in various other ways. It is used in medicine in the form of a solution, or diluted acid, to relieve disordered conditions of the mucous membrane and to strengthen the system when disease has caused softening of the bones.

Phosphorus, *fos for us*, a solid non-metallic substance which ranks as one of the elements. It occurs chiefly in combination with oxygen, calcium and magnesium, in volcanic and other rocks, whose disintegration constitutes very fertile soils. It exists also in the plants used by man as food and is an important part of animal structures. It is manufactured from bones, which consist in part of phosphate of lime, or from native mineral phosphate of lime. Common phosphorus, when pure, is almost transparent and colorless. At common temperatures it is a soft solid, easily cut with a knife, and the cut surface has a waxy luster. It melts at about 108° and is exceedingly inflammable. Exposed to the air at common temperatures, it undergoes slow combustion, emits a white vapor of a peculiar odor, appears luminous in the dark and is gradually consumed. On this account phosphorus should always be kept under water when it is desirable to preserve it. A very slight degree of heat is sufficient to inflame phosphorus in the open air. Gentle pressure between the fingers, friction, or a temperature not much above its point of fusion, kindles it readily. It burns rapidly, even in the air, emitting a splendid white light and causing

intense heat. Its combustion is far more rapid in oxygen gas, and the light is far more vivid. Compounds of phosphoric anhydride with basic bodies are known as *phosphates*. When dissolved in fat oils, phosphorus forms a solution which is luminous in the dark. It is chiefly used in the preparation of lucifer matches and in the preparation of phosphoric acid. It is the most powerful and diffusible of all stimulants, but on account of its activity it is highly dangerous. It can be safely administered as a medicine only in extremely minute doses and with the utmost possible caution.

Photius, *fo'she us*, (about 820—about 891), a patriarch of Constantinople, born of patrician parents in that city. His wealth and interest raised him to the highest offices of the State, while he enjoyed the reputation of being the most universally learned and accomplished man of his age. He became secretary of state under the emperor Michael III and contracted an intimacy with the minister Bardas, uncle of the emperor. On the deposition of the patriarch Ignatius, Photius was raised to the patriarchal dignity. The installation was opposed by Pope Nicholas I, whom a council assembled by Photius soon excommunicated, thereby beginning the schism between the Eastern and Western churches. The emperor Michael was murdered in 867 by Basil, who was raised to the throne, and that prince immediately replaced Ignatius in his office and banished Photius, who, however, resumed his dignity on the death of Ignatius. On the accession of Leo, son of Basil, to the imperial throne, Photius was again deposed and banished to a monastery in Armenia, where his death took place. Photius was an able ecclesiastical statesman and was a man of great intellect, erudition and literary power.

Pho'to-Engra'ving, a process of engraving, by which the picture is first transferred to the block or plate by means of photography. The result is a printed surface, corresponding to the original from which the photographic image was taken. For a description of the different phases of the process, see ELECTROTYPING; HALFTONE; LITHOGRAPHY, subhead *Photo-Lithography*; PHOTOGRAPHURE; ZINC ETCHING.

Photography, *fo tog'ra fy*, (Greek, *photos*, light, and *grapho*, to write), literally, the art of writing or drawing by light. It consists in the reproduction of portraits, scenes from nature or other objects, by the action of light upon a sensitized plate, placed in a camera.

Ordinary photography includes three proc-

Photography

esses—the exposure of the plate, or taking the picture; developing the exposed plate, or the negative, and printing the photograph, or the positive. The preparation of plates is an industry by itself, and the photographer obtains them ready for use. The plates used in studios and for most outdoor work are of glass, but for amateur work ribbons of film are extensively employed. The film has a back of celluloid and is put up in rolls, each roll containing a definite number of exposures. Since as good pictures can be produced by the use of one material as by the other, and film is very convenient for tourists, it is more desirable than glass for small cameras.

To obtain a good negative, the photographer must use care in making his exposure. The focus of the camera should be carefully adjusted; the instrument should be so placed that the light will fall upon the object, rather than upon the camera. The light upon the object should be such as to avoid sharp contrasts of light and shade, and the exposure should be timed according to the intensity of the light. The determination of the time is learned only by experience, and amateurs usually over-expose their plates. Views obtained by *snapshots* and *flash light* are results of instantaneous exposures. While very good negatives may be obtained in this way, they usually lack the detail of time exposures. The exposed plate does not show any trace of the picture.

The second step consists in the development of the negative. This must be done in the *dark room*, which is the photographer's laboratory. This room is fitted with shelves for holding the necessary chemicals and frames for holding the negatives. It should also contain a sink with running water and a drain pipe connected with a sewer. The room is dimly lighted with a small pane of red or orange-colored glass or by a red-glass lantern. The negative is developed by soaking it in a solution of pyrogalllic acid or some other substance that will produce a like result. There are numerous developers in use, but the pyrogalllic acid is more generally used than any other substance. The plate is laid in a shallow tray, face-side up, and the prepared liquid, called the *developer*, is poured upon it, after which the tray should be gently rocked to secure an even action of the developer upon all parts of the plate. In developing, the strongest lights and shades appear first, being followed by the more minute details. When these are all visible, the process should be stopped. This is done by removing the plate, washing in cold water and

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then placing in a bath of hyposulphite of soda, which dissolves the sensitive portion of the film not acted upon by the light. If the exposure and developing have been properly done, this last process should leave a clear, sharp negative. When taken from the hyposulphite bath, the negative should be thoroughly washed and then dried before being used for printing.

The picture developed on the plate is called the *negative*, because its lights and shadows are reversed, and in order to obtain a picture which resembles the object, a *positive* must be obtained. This is printed on prepared paper, the negative being placed face-side up in a frame, and the paper laid upon it and exposed to the light for a short time. After printing, the positive is *fixed*, by being soaked in a solution of hyposulphite of soda. It is then *toned*; that is, it is given its proper color by a solution of gold. After toning, the photograph should be thoroughly washed, to remove all traces of chemicals not solidified in the printing, otherwise the picture will fade and discolor. Many preparations for amateur work contain both the fixing and toning chemicals in the same solution, and devices for developing are in use which produce the finished negative by running the film through a specially prepared tank, containing the developer and so constructed that a dark room is not required. The great variety of effects seen is caused by the different methods of preparing the printing paper and the different ingredients used in toning solutions.

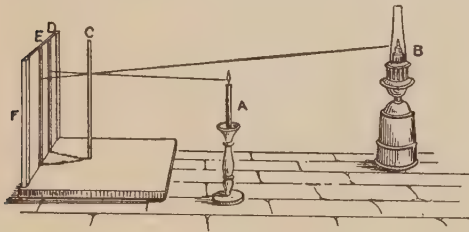
COLOR PHOTOGRAPHY. Pictures in natural colors are obtained by photography by the production of three negatives of the colored object, through screens of red, green and blue-violet glass, respectively. Glass positives of these negatives are made, and these are combined and projected through a magic lantern, producing a picture in the natural colors of the object. This process is also used in the so-called three-color printing, the halftone plates being made from negatives obtained by exposure through colored screens as here described. The colored picture is produced by printing from these plates, one after another.

HISTORY. The present degree of perfection in photography has been reached after years of study and invention. The first step in this art was the discovery, in 1809, by Thomas Wedgwood, of a way of making crude profiles by the action of light upon paper or cloth that had been soaked in a solution of nitrate of silver. Thirty years later Daguerre laid the foundation of photography by means of the process which bears his

name. It consists of printing the picture on sensitized glass (See *DAGUERREOTYPE*). The use of sensitized paper was introduced by a Frenchman named Niepes, and about 1851 the present process of photography was established by an Englishman named Archer, who began the use of the negative as we now know it. From this discovery the various steps in the progress of the art have been in perfecting sensitized plates and paper and in improving the camera. See *CAMERA*; *ELECTROTYPING*; *HALFTONE*; *LITHOGRAPHY*; *PHOTOGRAPHY*.

Photogravure, a process of engraving which combines photography and etching. A positive photograph of the drawing or photograph to be reproduced is made on glass. This is placed in a reverse position on a copper plate covered with a bituminous varnish, and the plate is then exposed to light. The portions of the varnish acted upon by the light are rendered insoluble, while those protected by the shadows remain unchanged. After exposure, the varnish is dissolved from the lines and the plate is etched. After etching it is "retouched" and improved with the graver. By the photogravure process the finest possible results are obtained, and it is extensively used for the production of large pictures, which rival the finest steel engraving in their delicacy and finish. It is also employed in the reproduction of photographs and smaller pictures for high class books. See *ETCHING*; *PHOTOGRAPHY*.

Photometry (Greek *phos*, light, and *metron*, measure), the art of measuring the intensity of a



source of light, by comparison with a standard of reference. Instruments called *photometers* have been devised for applying many different methods of measurement to each part of the spectrum of the light from each source. The degree of sensitiveness of the eye of the observer or a difference of sensitiveness between his two eyes affects the result. In other instruments used as photometers, what is measured is not the intensity of light, but the radiation of light. The relative intensity of light from stars is usually determined by a polarizing apparatus, which brings the bright-

ness of the star above that of the standard of comparison. One method of measurement is shown in the figure. The rod *C* is so placed that the shadows *E* and *D*, which fall upon the screen *F*, are of the same degree of intensity. The relative intensity of the lights is determined by their respective distances from the screen.

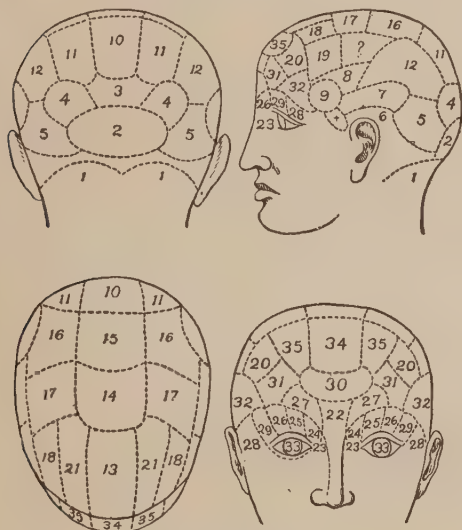
Photophone, an instrument invented in 1880 by Prof. Alexander Bell. It resembles the telephone, except that it transmits sounds by means of a beam of light, instead of by the connecting wire of the telephone. The success of the instrument depends upon a peculiar property of the rare metal selenium, namely, that of offering more or less opposition to the passage of electricity, according to the action of light upon it. In its simplest form, the apparatus consists, at the receiving end, of a plane mirror of some flexible material, such as silvered mica, upon which a beam of light is concentrated. The voice of a speaker directed against the back of this mirror throws the beam of light reflected from its surface into undulations, which are received on a parabolic reflector at a distance and are centered on a sensitive selenium cell, in connection with a telephone, which reproduces in articulate speech the undulations set up in the beam of light by the voice of the speaker. The photophone is interesting more as a curiosity than for its utility.

Phrenology, *frē nol'ō jī*, the name of a psychological theory, advanced by two Viennese physicians, Gall and Spurzheim, late in the eighteenth century. The fundamental beliefs on which the theory was based were that the brain was the organ of the mind; that it was a complex structure, composed of a number of different organs, at first estimated to be thirty-four and later forty-two in number; that each of these organs was the seat of a mental power or a sentiment; that the prominences in the skull indicated the location and size of the different organs and that any organ would increase in size and efficiency by the use of the power of which it was the seat. From this theory was developed a system of determining a person's aptitudes and characteristics by a process of examining the head. Charts showing the location of the different organs of the brain and marked with the mental power which each organ represented, were used, and the relative value of these organs was marked upon the chart when the person's head was examined.

Spurzheim came to the United States in 1832, but died soon after reaching this country. Nevertheless, phrenology gained a foothold here,

and for a number of decades it had quite a large following, especially in rural districts and smaller towns. These places were visited by lecturers, who gave discourses on the subject and amused their audiences by examining the heads of those who were willing to submit to their manipulations.

More recent investigations show that the beliefs upon which phrenology was based were



AFFECTIVE

I.—PROPENSITIES

1. Amativeness.
2. Philoprogenitiveness.
3. Inhabitiveness or Concentrativeness.
4. Adhesiveness.
5. Combativeness.
6. Destructiveness and Alimentiveness.
7. Secretiveness.
8. Acquisitiveness.
9. Constructiveness.

II.—SENTIMENTS

10. Self-esteem.
11. Love of Approbation.
12. Cautiousness.
13. Benevolence.
14. Veneration.
15. Firmness.
16. Conscientiousness.
17. Hope.
18. Wonder.
19. Ideality.
20. Wit.
21. Imitation.

INTELLECTUAL

I.—PERCEPTIVE

22. Individuality.
23. Form.
24. Size.
25. Weight.
26. Coloring.
27. Locality.
28. Number.

29. Order.

30. Eventuality.
31. Time.
32. Tune.
33. Language.

II.—REFLECTIVE

34. Comparison.
35. Causality.

without foundation. Nevertheless, the advocates of this theory rank as pioneers in the study of the brain and the nervous system, and from this beginning the work of investigation advanced until many of the functions of the brain have been scientifically located. What is now known as *brain localization* is supported by well authenticated experiments. The figure illustrates a typical phrenological chart.

Phrygia, *frij'e a*, in ancient geography, a region comprising the western central part of Asia Minor, containing the cities of Synnada, Laodicea and Colossae. The inhabitants were early civilized and paid much attention to grazing and tillage. The early history of Phrygia is mythological. Several of its early kings were famous in legend, especially Gordius (See GORDIAN KNOT) and Midas. On the death of Adrastus, the royal family of Phrygia became extinct and the kingdom became a province of Lydia. It afterward formed a part of the Persian, and still later, of the Roman, Empire.

Phtha, *thah*, an ancient Egyptian divinity, the creator of all things and the source of life; as such, father and sovereign of the gods. He was worshiped chiefly at Memphis, in the form of a mummy or of a pygmy.

Phylloxera, *fil loks'ur a*, a genus of plant lice, the typical form of which does great damage in vineyards. This species, which has become widespread, has attracted much attention of late years. It presents itself in two types, the one gall-inhabiting and the other root-inhabiting. Its proper home is North America, where it was known early in the history of grape culture, and where it doubtless existed on wild vines from time immemorial. Phylloxera were discovered in England in 1863, and about the same time they made their appearance in France, where they inflicted immense loss upon owners of vineyards. Widening their area, not only by natural means, but also by commerce in vines and cuttings, phylloxera spread to all grape-growing countries of Europe. Only where the soil was of a sandy nature did the vineyards escape. Generally speaking, the pest has now obtained a foothold, at least in restricted localities, in every country where the grapevine is cultivated. Vines attacked by phylloxera generally show external signs during the second year, in a sickly yellowish appearance of the foliage and in stunted growth, and the third year they frequently perish, all the finer roots having decayed and wasted away. Many remedies have been proposed, but none is universally practicable or satisfactory.

Physical, *fiz'ik al*, **Geog'raphy**. See PHYSIOGRAPHY.

Physical Training. See ATHLETICS.

Physick, *fiz'ik*, PHILIP SING (1768-1837), an American surgeon, born in Philadelphia, Pa., and educated at the University of Pennsylvania. In 1805 he was made professor of surgery in the University of Pennsylvania. One of his most brilliant successes was a remarkable surgical

operation on Chief Justice Marshall, which resulted in a perfect cure. He introduced numerous valuable instruments and improved modifications of others, and he applied many novel methods of treatment. He was called the "Father of American Surgery."

Physics, *fiz'iks*, the science which treats of the properties of matter and force, or energy. Physics is one of the oldest organized branches of natural science and was formerly known as *natural philosophy*. Originally it included mathematics, physics proper, chemistry, natural history, astronomy and geology, but with the development of science, each of these branches was organized as a separate science and treated by itself. The relation of these various branches to physics is shown in such subdivisions of them as geological physics and chemical physics. For a long time chemistry was supposed to be entirely distinct from physics, but the growth of each of these branches of science has brought them so close together that they are now found to be intimately related. The various subjects of physics in this work are treated under such titles as DYNAMICS; ENERGY; ELECTRICITY; GRAVITATION; HEAT; HYDRAULICS; LIGHT; MAGNETISM, and kindred topics. Also, see CHEMISTRY.

Physiognomy, the art of judging character from the countenance. Aristotle is the first who is known to have made any attempts in physiognomy. He observed that each animal has a special predominant instinct; for instance, the fox has cunning and the wolf has ferocity. He concluded that men whose features resemble those of certain animals will have similar qualities to those animals. The theory was adopted and illustrated by the French painter Lebrun, in the seventeenth century. Lavater was the first to develop an elaborate system of physiognomy, the scope of which he enlarged so as to include all the relations between the physical and moral nature of man. Physiognomy is closely related to phrenology, and the elaboration of phrenology by its leading advocates in the United States consisted largely in adding to it systems of craniology and physiognomy (See PHRENOLOGY). Physiognomy is of general interest and to a limited extent is practiced by every one. We are invariably influenced by the appearance of the face, in forming an estimate of one's character and ability.

Physiography, in its original meaning, that department of physical geography which explains the forms of the earth's surface; but in its present meaning in the United States, the entire science

of physical geography. It treats of the surface of the earth or any part of it, as regards its natural features and the changes that are constantly taking place or have taken place on it. It points out the natural divisions of land and water, such as continents, hills, rivers, seas and oceans. It treats of the external form, extent and location of mountains and valleys and of the outline and characteristics of coasts; also, of the relation and peculiarities of different portions of the earth's surface covered by water, including currents, wave action, depth of the sea, salt and fresh water lakes and the drainage of continents and countries. It treats of the atmosphere, especially in its relation to climate, and it discusses winds, storms, rainfall and general meteorology. It also treats of life upon the globe, especially of the distribution of plants and animals and their relation to their environment, tracing the influence of climate, soil, natural barriers or channels of communication upon the growth and spread of plants and animals, and especially upon the location and development of the various races of men. Physiography is very closely associated with all other branches of natural science.

The agencies which are still producing changes upon the earth's surface are the atmosphere, water and heat. The atmosphere causes changes through winds and rainfall. By these, hard portions of rock are disintegrated and loose portions are carried from higher to lower levels. Water is by far the most powerful agent in producing changes upon the earth's surface. It causes these changes through erosion, freezing and thawing, all of which disintegrate the rocks and aid chemical action, and by the operation of waves and tides. Heat, which is the great internal force of the earth, causes changes by producing changes of temperature and by volcanic action. While the exact condition of the interior of the earth is not known, it is generally conceded that the rise and fall of continents and other great movements which occur either gradually or instantly are due to contraction of the earth's crust, caused by the gradual cooling of the interior. In volcanic regions the surface is frequently changed by eruptions. (See EROSION; RAIN; WIND.)

See VOLCANO; EARTHQUAKE; GEOGRAPHY; GEOLOGY. Consult *Physiography of the United States*, by the National Geographic Society, and Shaler's *Aspects of the Earth*.

Physiology, *fiz i ol'o jy*, that branch of science which deals with the functions, properties, changes and actions of the living body, either

animal or vegetable. This article deals with the former. The knowledge of physiology has been gained by observation, by experiment and by studying the conditions in disease. The greatest advancement has been made since Harvey discovered the circulation of the blood, though much work of a valuable kind was done by the early Egyptians and Chinese and the philosophers of Greece. Hippocrates (450 B. C.), the father of medicine, first showed that disease was due to natural causes. Galen (150 A. D.) proved that the arteries contain blood and not air; that the brain, spinal cord and nerves are the organs of intelligence and sensation, and that the nerves of sensation and motion are distinct. In the sixteenth century it was learned that the lungs purify the blood. Then followed, in the seventeenth century, Harvey, Malpighi and Leeuwenhoek; Haller, in the eighteenth; Müller, in the nineteenth, with Cuvier, Schwann, Von Mohl, Hall, Weber and Darwin, all of whom have added contributions that have made physiology the valuable science it is to-day.

The functions of the body are growth, reproduction, motion, nutrition and those movements connected with the nervous system, all of which have been treated of more or less fully under BRAIN; DIET; DIGESTION; FOOD; LACTEALS; LYMPH; MUSCLE; RESPIRATION; SECRETION; SENSES, SPECIAL; NERVOUS SYSTEM, and kindred topics.

Pi. See CIRCLE.

Piacenza, *pe a chen'tsa*, a city of northern Italy, the capital of the Province of Piacenza, nearly equidistant from Parma and Milan, near the confluence of the Trebbia with the Po. It has broad, regular streets and some beautiful buildings, but it is nevertheless a desolate-looking city. There is a fine cathedral, begun in the eleventh century, besides several other notable churches, the great Palazzo Farnese, now used as barracks, a public library and a beautiful theater. The city is an important railway center and has manufactories of silk, cotton and woolen goods, stockings, hats, leather and machinery. Piacenza was originally a Roman colony and was founded in the third century B. C. From the sixteenth century on, the city shared the fortunes of Parma. Population in 1911, 38,542.

Pian'o or **Pian'oforte**, a musical stringed instrument. The strings are extended over bridges, resting on a thin wooden vibrating sounding board, and are made to vibrate by means of small felted *hammers*, which are put in motion by levers connected with *keys*, pressed by the fingers

of the performer. There are also *dampers*, which deaden the sound after the note is struck.

The name *pianoforte* is compounded of two Italian words, signifying *soft* and *strong*, and the piano was so called in distinction to the harpsichord, the instrument which it superseded, in which it was not possible to increase or diminish at will the strength of the notes. The mechanism by which the movement of the keys is conveyed to the strings is called the *action*, and in no part of the instrument is careful adjustment of parts more necessary, in order to produce an agreeable and firm quality of tone. When these parts are correctly adjusted, a skilful performer, by carefully controlling the force with which he strikes the keys, as well as the manner of striking, can produce tones of widely different quality, to accord with the purpose and meaning of the composition. There are usually three strings for each note, in the higher and middle octaves, two in the lower and one in the lowest notes. The strings are of steel wire. The lowest notes have their strings wound round with a double coil of brass wire, and those next above are wound round with a single coil. All pianos have two *pedals*, and some have more. These are worked by the feet, and when pressed down, by moving the hammers or dampers, with relation to the strings, they regulate the intensity of the stroke of these mechanisms and consequently control the quality and intensity of the sound.

Pianos are either *grand pianos*, in which the strings lie in the direction of the keys, or *upright pianos*, which have the strings stretched vertically, perpendicular to the keys. Recently a variety called the *upright grand* has also been introduced. The common compass of the piano at present is six and seven-eighths or seven octaves.

The invention of the piano can scarcely be ascribed to any one man. The first satisfactory hammer action appears to have been invented by an Italian of Padua, named Bartolommeo Cristofali, about 1711. The instrument was not introduced into England till the latter half of the eighteenth century. Among the principal improvers of the pianoforte are Sebastian Erard, the founder of the celebrated firm still in existence; Roller et Blanchet, the French firm, which introduced the upright piano; Collard, Bechstein; Steinway, and many others.

Pianoplayer, any one of many instruments designed for playing a piano automatically. There is a little hammer opposite each piano key, except those at the extreme ends of the keyboard, the hammers being operated by air pressure, pro-

duced by a bellows operated by the feet of the performer. The action of each hammer depends upon the suction of air into its tiny compartment, the suction being regulated by the passage of a sheet, previously perforated to correspond to a selection of music, over a row of tiny openings. By means of levers and strings the speed at which the sheet moves, and, therefore, the time of the music, can be very closely regulated; also, the intensity and duration of the tone. However, there is always a mechanical regularity in the music.

Pias'ter or **Pias'tre**, the monetary unit of Turkey, a silver coin equivalent to about $4\frac{2}{5}$ cents of American money. Silver half-*piasters*, copper *piasters* (equivalent to $\frac{1}{10}$ the silver *piasters*), copper *paras* (equivalent to $\frac{1}{40}$ of the silver *piaster*), silver 20-*piasters*, gold 25-*pasters*, gold 100-*piasters* and gold 500-*piasters* are also coined. The same name is applied to coins of other nations. The Egyptian *piaster* is about one one-hundredth of the English pound sterling, or about five cents. The Spanish *piaster* is the same as the *peseta*.

Pick'ens, ANDREW (1739-1817), an American soldier, born at Paxton, Pa. He removed to South Carolina in 1752, fought in the wars against the Creeks and Cherokees in the following years and at the outbreak of the Revolutionary War became brigadier general of the state militia of South Carolina. Throughout the struggle he exhibited the greatest bravery, in command of an independent partisan force, and he especially distinguished himself at the battles of Cowpens and Eutaw Springs. He was a member of the state legislature from 1783 to 1794, served one term in the Federal Congress, returning to the legislature in 1801, and retired in 1812.

Pickens, FRANCIS WILKINSON (1805-1869), an American statesman, born in South Carolina, educated at South Carolina College and admitted to the bar. He was elected to the state legislature, where he advocated nullification. In 1834 he was elected to Congress and served for five successive terms. In 1857 he was made United States minister to Russia, but at the outbreak of the Civil War he returned to America and was elected governor of South Carolina. He was a zealous secessionist, early organized an independent government and demanded the surrender of Fort Sumter. This being refused, he erected the batteries which later caused the fall of the fort.

Pick'ereel. See PIKE.

Pick'ering, TIMOTHY (1745-1829), an American statesman, born at Salem, Mass., educated at Harvard University and admitted to the bar. During the pre-Revolutionary period, he was conspicuous as the author of numerous patriotic pamphlets. He served during the war in the Revolutionary army, became a member of the board of war and in 1791 was appointed post-master-general of the United States. Four years later he became secretary of war, and in this position he established the military academy at West Point and furthered the construction of a navy, of which the *Constitution* and the *Constellation* were begun during his term. He succeeded Edmund Randolph as secretary of state, but was removed in 1800 on account of a disagreement with President Adams. He soon moved from Pennsylvania to Massachusetts, where he was elected chief justice of the court of common pleas, and in 1803 he entered the United States Senate. Eight years later he was elected to the House of Representatives, where he served until 1817.

Pick'et. See PIQUET.

Pick'ett, GEORGE EDWARD (1825-1875), an American soldier, born in Richmond, Va. He graduated at West Point and served with distinction in the Mexican War, also on the Western frontier, but at the opening of the Civil War he resigned from the army and became a major in the Confederate service. He was gradually promoted until he became major general, on account of distinguished service in the Peninsula campaign. He fought at Fredericksburg and led the famous charge at Cemetery Ridge in the Battle of Gettysburg. During the remainder of the war he held numerous important commands, and at its close he engaged in business in Richmond.

Pickles, vegetables and certain fruits, first steeped in strong brine and then preserved in close vessels. Wood vinegar is often used, but malt or wine vinegar produces the best pickles. Owing to the corroding effects of brine and vinegar, the use of metallic vessels should be avoided in making pickles. To give a green color to pickles, verdigris and other poisonous compounds of copper are sometimes employed by manufacturers. Cucumbers, green tomatoes, olives and limes are extensively used in the manufacture of pickles.

Picric Acid, a solid acid and bitter substance, obtained by the action of nitric acid on organic substances; also, by adding nitric acid to a mixture of carbolic acid and sulphuric acid. It was

formerly of great importance in dyeing, giving a bright yellow color. It is now most largely used in making explosives, sometimes by itself, sometimes in combination with potash, soda or ammonia.

Picts, the name given to the ancient Caledonians, usually regarded as a Celtic race, inhabiting North Britain till the beginning of the sixth century.

Piedmont, *peed'mont*, a territorial department of the north of Italy. It is surrounded by Switzerland, Lombardy, Liguria and France and has an area of about 11,300 square miles. It forms the upper valley of the river Po and derives its name, which means "Foot of the Mountain," from its station at the base of the loftiest ranges of the Alps, by which it is enclosed on all sides, except toward the Lombard plain. It forms one of the most fertile and beautiful parts of Europe, descending from the north, south and west in slopes and terraces to the plains of the Po. It produces, extensively, wheat, maize, rice, hemp, sugar beets and fruits and large quantities of silk. Population in 1911, 3,424,450. Piedmont formed the most important part of the kingdom of Sardinia. See **SARDINIA, KINGDOM OF**.

Piedmont Region, a name given to the part of the Atlantic coastal plain in the United States, situated between the Appalachians and the coastal plain proper. In general, the boundary between the Piedmont region and the coastal plain is marked by the Fall Line, which also discloses the geological difference between the two regions. The Piedmont plain consists of older and harder rocks. In New England the Piedmont region is not clearly evident, but in the extreme south it broadens to a width of nearly 300 miles.

Pier, *peer*, in architecture, the name applied to a mass of masonry between openings in a wall, such as doors or windows, and to the solid support from which an arch springs or which sustains a tower. In medieval architecture the pier was a square column. The term is also applied to a mole or jetty carried out into the sea, intended to serve as an embankment to protect vessels from the open sea and to form a harbor.

Pierce, **FRANKLIN** (1804-1869), an American statesman, fourteenth president of the United States. He was born at Hillsborough, N. H., and was educated at Bowdoin College, where he was the friend and associate of Nathaniel Hawthorne, Sargent S. Prentiss and Henry Wadsworth Longfellow. He studied law, was admitted to the bar in 1827 and was chosen to the state legislature, to which he was three times re-

elected. In 1832 Pierce was elected to the Federal House of Representatives, where he served until elected to the United States Senate in 1837. At his election he was the youngest member of that body, but soon became conspicuous as an eloquent supporter of President Jackson, though somewhat overshadowed by such men as Benton, Clay, Calhoun, Webster and Silas Wright.

He resigned before completing his term and resumed the practice of law at Concord, N. H., consistently declining many offers of public office.



FRANKLIN PIERCE

However, he still took active interest in political affairs and was a frequent counselor of the leaders of the Democratic party. At the outbreak of the Mexican War, Pierce entered the service as a private soldier, but was soon made a brigadier general of volunteers and participated in the battles of Vera Cruz, Contreras and Churubusco.

Returning to New Hampshire, he was made presiding officer of the state constitutional convention, and in 1852 he became the candidate of the Democratic party for the presidency, being nominated as a compromise candidate after a long struggle between Buchanan, Douglas, Cass and Marcy. He was elected by an electoral vote of 254 to 42, carrying all but four of the states. He chose a cabinet of exceptional ability and distinction, which was also remarkable for the fact that it was not changed during his administration. Among the important events of his

Pigeon

term were the Gadsden Purchase, the conclusion of commercial treaties with Great Britain and Japan, the promulgation of the Ostend Manifesto and the passage of the Kansas-Nebraska Bill. As president, Pierce failed to maintain his reputation as a statesman of extraordinary ability, and his policy upon the slavery question aroused considerable discontent in the Northern states. At the close of his term he spent several years in travel, but took no further part in politics.

Pigeon, *pi'jun*, the name given to a large group of birds, of which the dove is the best representative. There are over 500 species, many of which are natives of the islands in the Pacific Ocean. Most pigeons are of medium size, and they generally build flimsy nests in trees, laying two eggs, on which both birds sit in turn. The color of most pigeons in the temperate regions is a dull gray, brown or slate, though some are black and white; but those of the tropical regions have bright shades of blue and purple. The largest of the wild pigeons are the *gouras* of Papua and adjacent islands. These birds are more than two feet long, wear large and showy crests and have a rich color. In the United States the *passenger pigeon* (See PASSENGER PIGEON) and the *mourning dove* are the representatives of the wild pigeons. The *common pigeon*, or *dove*, is derived from the wild *rock dove* of Europe. *Turtledoves* are small pigeons found in most parts of the world. They have strong powers of flight and are difficult to domesticate. The *fantails* are so named from their large erect tails, which open like a fan. The *pouters* swell up their crops until they are very large and give the bird a ridiculous appearance. The *jacobins* are distinguished by a big ruff of feathers about their necks and heads. The *tumblers* turn somersaults in the air during their flight. Some of these and other varieties are very handsome and command a high price from people who fancy them. The *homing pigeon*, also called the *carrier pigeon*, has a remarkable sense of direction and great power of flight (See CARRIER PIGEON).

Pig'ments. See PAINTS.

Pig'weed, a plant belonging to the Amaranth family, native to tropical America, but now common in the United States. It has dull green leaves and crowded spikes of small greenish flowers. The plant is tall and straight and is without spines. To eradicate this plant, prevention of its seeding, thorough cultivation of the soil and uprooting of the plant as far as possible are necessary. The pigweed is often called *beetroot*, because of its red root.

Pike Perch

Pi'ka, the common name for several different little animals, which are known as *calling hares*, or *conies*, or, in the case of the species common in the western United States, *starved rat* or *little chief hare*. All of them are more like guinea pigs than



CALLING HARE

like hares and are timid and quite harmless. The American species, which is found in the mountains usually just above the timber line, lives upon grass, which it cuts, dries and stores away with dried vegetables for its winter fodder.

Pike, the name of a group of fishes found in the fresh waters of both Europe and North America. In the United States this fish is commonly known as the pickerel. It has a long, slender body, with a long head and large mouth. It is very voracious and destructive to smaller fish. The pickerel is a fine game fish and is usually taken by hook and line. The flesh is somewhat coarse and has not as good a flavor as the salmon or trout, yet the fish is quite highly prized for food. The so-called *wall-eyed pike*, or *wall-eye*, common to northern lakes, is really a species of perch. See PERCH.

Pike, ZEBULON MONTGOMERY (1779-1813), an American soldier and explorer, born at Lambertton, N. J. He was taken in childhood to eastern Pennsylvania, where he entered the army, becoming first lieutenant in 1800. Five years later he led an exploring expedition into the territory of the Louisiana purchase, and in the following year he started upon a similar journey. On this expedition he reached the site of Pueblo, Colo., discovered Pike's Peak, which was named for him, and was captured by the Spanish while searching for the Red River, but was later released. He was soon promoted in the army to the rank of colonel and was nominated brigadier general, but he died before the Senate acted upon his name. He was killed by an explosion in the expedition against York, Canada, in the War of 1812.

Pike Perch, a genus of fishes, closely allied to the perch, but showing a resemblance to the pike in its elongated body and snout. Like the pike, it is a dangerous enemy to other fresh-

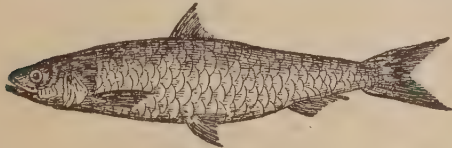
water fishes, but the flavor of its flesh is excellent. It is usually under two feet in length, though certain species grow larger than this. It occurs in the fresh waters of the Great Lakes, the Upper Mississippi and the Ohio, in the streams of Europe and in western Asia.

Pike's Peak, one of the highest summits of the Rocky Mountains, in the center of the State of Colorado. It is 14,107 feet in height and is capped with snow. Its sides are covered with pine forests to a height of almost 12,000 feet. A rack-rail railway takes tourists to the summit during the summer.

Pila'ster, in architecture, a square pillar, projecting from a pier or a wall to the extent of from one-fourth to one-third of its breadth. Pilasters originated in Grecian architecture. In the Roman, they were sometimes tapered like columns and finished with capitals, modeled after the order with which they were used. In the early Renaissance ornamental pilasters were very common. See COLUMN.

Pi'late, PONTIUS, the fifth Roman procurator of Judea, who succeeded Valerius Gratus in 26 A. D. Nothing is known of his early history. He was a narrow-minded and impolitic governor, and at the very beginning of his term of office his acts led to commotions among the Jews at Jerusalem. When Christ had been condemned to death by the Jewish priests, who had no power of inflicting capital punishment, he was carried by them to Pilate to be executed. Yielding to the clamors of the Jews, the Roman governor ordered Jesus to be crucified, but he permitted Joseph of Arimathea to take his body and bury it. Pilate was afterward removed from his office by Vitellius, prefect of Syria, 36 A. D., and, according to tradition, he was banished by Caligula to Vienna (Vienne), in Gaul, where he is said to have died or committed suicide some years after.

Pil'chard, a species of fishes included among the herrings, which they much resemble, though



PILCHARD

they are rather smaller. Pilchards frequent the coasts of Britain all the year round. The usual spawning time is October, when they are found in great abundance on the southern coasts of England, the Cornwall fisheries being the best

known. Pilchards are chiefly consumed in Spain, Italy and France during Lent and other fasting seasons. Many of the commercial sardines are in reality young pilchards.

Pilcomayo, *peel ko mah'yo*, a river of South America, which rises in Bolivia in the eastern slope of the Andes, flows southeast and falls into the Paraguay near Ascuncóin, after forming part of the boundary between Paraguay and the Argentine Republic. Its entire length is estimated at 1200 miles. On account of its shallowness during the dry season and the strong currents in the narrow places, the river does not appear likely to become useful for navigation.

Pile, a long post, driven into soft earth, to support a building or to make a defense against water. In the former case a pile is usually a log of wood, sharpened at the point, which sometimes is protected with an iron shoe, to enable it to penetrate the harder strata of the earth. The most common purpose to which piles are applied in temporary structures is to make cofferdams (See COFFERDAM). The piles used are now often of cast iron or concrete, sometimes solid and sometimes hollow. Piles are driven by a heavy iron block, raised and let fall alternately, this in extensive works being accomplished by means of machinery operated by steam.

Pil'grims, the name first applied by William Bradford to the body of English Separatists who established the first English settlement in Massachusetts, at Plymouth. They had removed from England to Leyden, Holland, in 1608, and in 1620 they had migrated to America. They are also called "the Pilgrim Fathers." See PLYMOUTH COLONY: MASSACHUSETTS, sub-head *History*.

Pil'lory, a frame of wood, erected on posts, with movable boards, so notched as to form holes, when closed, through which were put the head and hands of a criminal for punishment. In this manner convicted persons were exposed to public view and to insult. It was a common punishment in America during colonial days.

Pil'low, GIDEON JOHNSON (1806-1878), an American lawyer and soldier, born in Williamson County, Tenn., and educated at the University of Nashville. He began the practice of law in Columbia, Tenn., in 1828, and at the outbreak of the Mexican War he entered the army and was made brigadier general, in command of the Tennessee troops. He participated in all the important battles and became major general in April, 1847. He was tried for insubordination, but was acquitted, and he returned to the prac-

tice of law. He entered the Confederate army at the opening of the Civil War, became a brigadier general, opposed Grant at the Battle of Belmont and was second in command at Fort Donelson, but escaped before the fort surrendered. In the later years of the war he was entrusted with minor commands.

Pills'bury, CHARLES ALFRED (1842-1899), an American manufacturer and capitalist, born in New Hampshire. He early removed to Minnesota, settling at Minneapolis, where, in the course of the next few years, he founded the milling company which soon built the largest flour mills in the world. In 1889 he became the head of a syndicate which controlled the Pillsbury-Washburn mills. He owned many patents on machinery for the improvement of the milling process and introduced many valuable devices. He was United States senator from Minnesota as a Republican from 1877 to 1887.

Pillsbury, JOHN SARGENT (1828-1901), an American merchant and politician, born at Sutton, N. H. When twenty-seven years of age he removed to Minnesota and engaged in the hardware business at the Falls of Saint Anthony, now Minneapolis. He afterwards became interested in the lumber trade, and later, with his brother, Charles A. Pillsbury, he founded the largest flour-producing establishment in the world. He was for twelve years state senator, was governor of Minnesota from 1876 to 1882 and was a member of the board of regents of the state university for forty years. During his administration as governor he secured the payment of the state debt, which had been repudiated years before. He gave Science Hall, costing \$150,000, to the University of Minnesota.

Pi'lot, a person qualified to navigate a vessel within a particular district. In many countries ships are compelled to take on or carry licensed pilots upon entering certain waters. In the United States the power of regulating pilots is in the hands of Congress, but many states legislate for their own territory, subject to general rules established by Congress.

Pilot Fish, a genus of fishes included in the mackerel family. It is silver gray in color, with five blue-black bands around the body, and is about a foot in length. The pilot fish was formerly supposed to act as a pilot to the mariner and is still supposed to act as such to sharks. It often follows in the wake of ships for long distances, associating with sharks and devouring the refuse thrown overboard.

Pil'sen, a town of Bohemia, situated in a valley at the confluence of the Radbusa and the Mies, 52 mi. w. s. w. of Prague. It consists of the city proper, a well-built town with promenades on the site of the old ramparts, and several suburbs. Saint Bartholomew's Church, which dates from the thirteenth century, a Renaissance townhall and a number of museums are among the most noteworthy buildings. The chief article of manufacture and commerce is the famous Pilsener beer. Coal, iron and alum are found in the neighborhood, and there are manufactures of bells, glass, wire, paper and pottery. During the Thirty Years' War, Pilsen was for a time the headquarters of Wallenstein. Population in 1910, 80,343.

Pima, *pe'ma*, one of the principal indian tribes living in southern Arizona and northern New Mexico. Once they were Pueblo indians, living farther north, but having been driven south, they built small, dome-shaped dwellings of brush, covered with earth and straw. They are agricultural in their habits, and the women weave water-tight baskets and make pottery. There are about 5000 persons in the tribe.

Pin, a piece of wire, generally of brass, sharp at one end and blunt, with a head, at the other. By the old methods of manufacture by hand, the distinct processes, from the straightening of the wire to the spinning and hammering of the head, were usually fourteen. Among the most important improvements in the making of pins are the machines by which the head is formed from the pin itself and the machine for sticking the pins in paper—both American inventions. Solid-headed pins, now universally used, were first made in 1824. The consumption of pins in the United States is estimated at thirty millions a day.

PIN MAKING. Pins are made from brass wire (See WIRE). The wire is wound on a large reel, which is hung over the pin-making machine. In this machine the pin is cut from the wire, headed, pointed, sharpened and polished. This machine is a combination of steel fingers, rollers, cams, toggle joints, headers, revolving files and belts. The wire, caught by a pair of rollers, is drawn forward into the machine, where it is cut into the right lengths; two raps from a cam and toggle form the head. A steel finger puts the headed wire on a wheel under the heading dies, and the pointless pin is carried down between two revolving steel disks. One of them revolves faster than the other, so the pin is turned round as it travels forward. Just at this point, it comes in

contact with four revolving files, which point the pin, and then an emery belt puts the first polish on it. The pins drop from the machine at the rate of 160 a minute and fall into a hopper, from which they are taken to the tinning room. In passing from the pin machine, the pins become covered with oil and dirt, and this is removed by putting them into a revolving iron barrel, with sawdust. The tinning process consists in the pins being boiled for four hours in a preparation of pure tin. They are then washed with strong soapsuds, to give them a smooth surface. After being rolled through the sawdust again, they are ready to be stuck into papers.

The sticking machine crimps the paper and sticks the pins in at the same time. The pins are put in a hopper, from which an inclined steel plate, furrowed with little runs, or channels, leads to the machine. The pins are caught by revolving steel fingers and pushed forward upon the inclined plate into the runs. The runs converge to a plate, which moves slightly back and forth across the rows of slots. This cutting off plate catches the pins, and when the holes are full a number of little rams or hammers shove the pins into the crimp of the paper which is formed a second before the pins are stuck in.

Pinchot, *pin'sho*, GIFFORD (1865-), an American authority on forestry, born at Simsbury, Conn. He graduated at Yale in 1889, studied his profession in the principal countries of Europe, and on his return to America, began the first systematic forest work in this country at Biltmore, N. C. (1892). He organized, developed, and made possible the great success of the Division of Forestry, of which he was chief from 1898-1910, and he took a prominent part in the conservation movement in the United States. After serving as chairman of numerous committees, he was elected president of the National Conservation Association in 1910. He is the author of *The White Pine* (in collaboration with Prof. H. S. Graves), *The Adirondack Spruce*, and *A Primer of Forestry*.

Pinckney, CHARLES (1758-1824), an American statesman, born at Charleston, S. C. At the age of twenty-one he was chosen to the provincial legislature, was sent to the Continental Congress in 1785 and was a member of the Federal constitutional convention two years later. He was three times governor of South Carolina, from 1789 to 1792, from 1796 to 1798 and from 1806 to 1808. Meantime, he served as United States senator, as minister to Spain and in the state legislature. He also served in the national

House of Representatives from 1819 to 1821, where he opposed the Missouri Compromise.

Pinckney, CHARLES COTESWORTH (1746-1825), an American statesman, born at Charleston, S. C. In the Revolutionary War he displayed great bravery, and for two years he was a prisoner of war. In 1787 he was member of the convention that framed the Constitution. As minister to France in 1796 he uttered the famous words which soon became a war cry in America, in response to a demand by Talleyrand for a bribe, "Millions for defense, but not one cent for tribute." He was twice the unsuccessful candidate of the Federalists for president.

Pinckney, THOMAS (1750-1828), an American diplomat and soldier, born at Charleston, S. C. He was educated in England and was there admitted to the bar, but returned to Charleston in 1772, served in the Continental Army during the Revolutionary War and was captured at Camden. After the war he was elected governor of the state, was later minister to England, and in 1794 was special commissioner to Spain, where he negotiated a treaty granting free navigation of the Mississippi. In 1796 he was the candidate of the Federalists for vice-president. He later served one term in Congress. He also fought in the War of 1812 as major general.

Pin'dar (about 522-about 445 B. C.), the greatest of the lyric poets of Greece, born in Boeotia, in or near Thebes, of a noble family. At an early age he was instructed in music and poetry; and for the development of his poetical talent he was sent to Athens. In after life he showed himself a great admirer of Athens and the Athenians, who rewarded him for the honors he paid to them by making him a public guest of the city and giving him a present of 10,000 drachmas. After his death they erected a statue in his honor. He was held in great esteem by many princes of Greek states, for whom he composed choral songs, and he was supposed to be an especial favorite of the Delphic oracle. He practiced all kinds of lyric poetry, but the only remains we have of his work are his *Hymns of Victory*, odes written to celebrate the victors in the great Grecian games.

Pine, the most numerous trees of the cone-bearing family. There are about thirty-five species found in North America, and nearly as many more are known in other parts of the world. The pine is characterized by its long, evergreen, needle-shaped leaves, which grow from a sheath in clusters of from one to five. Its branches are arranged in whorls and project nearly horizon-

Pine

tally. The bark is reddish-brown, and the wood is fine-grained and adapted to many uses. In accordance with the quality of the wood, pine is classed as *hard pine* and *soft pine*. In some localities the hard pine is called *pitch pine*.

The *white pine* is common from Canada to North Carolina and Georgia, along the Appalachian Mountains and westward to Tennessee. In the northern part of this belt, the trees extend



PINE CONES

a, Cone of the dwarf Mugho pine; b, cone of the Italian stone pine; c, cone of the cluster pine; d, cone and needle of the great-hooked, or Coulter's pine; e, cone and needle of the sugar pine.

westward to Minnesota, while extensive forests are found in Canada, along the Saint Lawrence and Ottawa rivers as far west as Lake Superior. The tree often attains a large size, being from 70 to 150 feet in height and sometimes having a diameter of 7 feet, though trees of this size are rare. The wood is white, soft, fine-grained and durable, and it is the most useful wood in the world for lumber. This tree was the chief source of lumber in the United States and Canada for more than 250 years, but has been supplanted by the yellow pine. Maine, Michigan, Wisconsin and Minnesota have been the great lumber states, but the lumbering industry has caused their forests to be rapidly depleted, and in some localities they are denuded of merchantable timber. The cut of white pine in the United States, in 1899 about 7,500,000,000 feet, was only 3,900,000,000, in 1909.

The *yellow pine* or *Georgia pine* is found in the Southern states, from North Carolina to Florida and westward to the Mississippi, and in detached forests in Arkansas, in some portions of Louisiana

Pineapple

and in Texas. The wood is of a color darker than that of the white pine; it is hard and fine-grained and it contains considerable pitch. It forms a strong and elastic lumber and is especially valuable in the construction of ships, bridges, viaducts and frames for large buildings. It is also used for flooring and inside finishing. This tree is also the source of tar, turpentine and resin (See TAR; TURPENTINE).

The *sugar pine* is a large tree, often attaining a height of 250 feet and a diameter of 6 to 10 feet. It is found in the forests of Oregon, Washington and northern California. Its wood resembles that of the white pine, and the tree is a valuable source of lumber. Among other species are the *dwarf Mugho*, the *Italian stone*, the *cluster* and the *great-hooked*, or *Coulter's*, pines. See FORESTS; LUMBER.

Pineapple, a tropical fruit which takes its name from its outward resemblance to a pine cone. The pineapple is a biennial. It has long pointed leaves, whose edges are in most species furnished with sharp spines. The leaves are thick and juicy. From the center of the cluster a stem rises two or three feet and bears on its upper end a flower cluster, in the form of a conical spike. Each flower is placed in the axil of a bract, except those near the top, which develop into a cluster of small



PINEAPPLE

leaves, which crowns the ripened fruit. The fruit is the thickened fleshy flower stalk, and in this respect, as well as in its odor and flavor, the pineapple somewhat resembles the strawberry.

The pineapple is a native of South America and the West Indies, where the early Spanish explorer discovered it to be cultivated by the Indians. It is highly prized and has been carried to the warm countries of Europe and Asia. In England it is raised in hot houses. Its successful culture requires a warm climate and abundant moisture. The fruit varies in size from two to twelve pounds. About fifty species are known. The fiber of the leaves is often woven into deli-

Pine Bluff

cate and beautiful fabrics. That of the Philippines is called Pina muslin.

Northern Africa, the Azores, the Bahamas, West Indies, Florida and California supply the European and American markets. Large quantities are also raised in Queensland, Australia, and the Philippine Islands.

Pine Bluff, ARK., the county-seat of Jefferson co., 42 mi. s. by e. of Little Rock, on the Arkansas River and on the Saint Louis & Southwestern, the Saint Louis, Iron Mountain & Southern and other railroads. It is in a fertile cotton-growing region, has a large trade in cotton and lumber and contains railroad shops, cotton compresses, cottonseed oil mills, a foundry, iron works, a printing house, and furniture and other factories. It is the seat of a state normal college for colored students, and the state fair is held here annually. The city has a girls' industrial school, an opera house, a courthouse, several fraternal society buildings, and the Merrill Institute. Population in 1910, 15,102.

Pinero, ARTHUR WING, *pin ayr'o* (1855-), a dramatist, born in London, of Jewish ancestry. He began the study of law, but soon entered upon a stage career. His first play was produced in 1876 and was fairly successful. After that time he continued to write and produce dramas, which were almost uniformly popular. Among his best known works are *Sweet Lavender*, *The Second Mrs. Tanqueray*, *His House in Order* and *Mid-Channel*.

Pines, ISLE OF, one of the West India Islands, situated 35 mi. s. of Cuba, to which it belongs politically. The area is about 900 square miles. The coast line is irregular, and the surface is interspersed with mountains and plains. The island is well watered and has a number of small rivers. The climate is mild and even, and the soil is well adapted to the growing of fruit and live stock. Tobacco is also raised, and pine, mahogany, cedar and other woods are produced. The island also contains a valuable marble quarry. Tar, turpentine and pitch are manufactured to some extent. Population in 1889, 3199, of whom a large part were emigrants from the United States, who control most of the industry of the island. The presence of these citizens of the United States led, in 1905 and 1906, to a serious agitation for annexation to the Union.

Pine Tree Shilling, the name given to the largest of several coins issued by the colony of Massachusetts in 1652. The others were six-pence and three-pence pieces. On one side was a rude engraving of a pine tree, encircled by the

Pinkerton

words *Masachusetts In*. Upon the other was the expression 1652, *XII*, encircled by the words *New England* and *An. Dom*. The weight was about seventy-two grains, and the value was about eighteen and one-fourth cents.

Ping Pong, a game modeled closely after lawn tennis, but played in the parlor on a table or board. The ball is a light hollow sphere of celluloid, and small rackets similar to tennis rackets are used. At one time ping pong was a very popular game, for almost any kind of table can be used by merely stretching a net across the middle of it. A single service only is allowed in ping pong, and in this respect it differs from lawn tennis, but the score is counted in the same manner as in the latter game.

Pin'gree, HAZEN SENTER (1842-1901), an American politician and manufacturer, born at Denmark, Maine. He learned the trade of a shoe cutter, but entered the Union army in 1862 and served during the war, being captured by Mosby and imprisoned at Andersonville for several months. He subsequently located in Detroit, and in 1866, with C. H. Smith, he started a small shoe factory, which has become one of the largest manufacturing establishments in the West. He was mayor of Detroit from 1889 to 1896 and was governor of Michigan from 1896 to 1900. Mr. Pingree was the leader in a number of municipal reforms in Detroit and was a strong advocate of municipal ownership of street railways. While governor he attempted to reform the methods of taxation.

Pink, a genus of flowers, most of the species of which are natives of Europe and parts of Asia. Many are cultivated in gardens, for their beauty and fragrance. One species, including carnations and clove pinks, grows wild in southern Europe. *The China*, or *Indian*, *pink* is another beautiful species and is widely cultivated. Besides these, there are the *common pink*, with fringed petals and rough-edged leaves, and the *sweet-william*, common in gardens.

Pink'erton, ALLAN (1819-1884), a detective, born in Scotland. He moved to Chicago in 1841 and was made deputy sheriff and a member of the detective department of the Chicago police in 1850. Later he organized a private detective force, which became famous for its thorough organization and remarkable achievements. He was head of the secret police of the Union army during the Civil War. Among the books which he published are *Criminal Reminiscences*, *The Gypsies and the Detectives*, *The Burglar's Fate*, *The Spy of the Rebellion* and *Thirty Years a*

Pinturicchio

Detective. The organization of the Pinkerton detectives which he effected is still in existence.

Pinturicchio, *peen too re'ke o*, (1454-1513), an eminent Italian painter of the Umbrian school, whose real name was Bernardino di Betto, born at Perugia. He lived for a time at Rome, and while there he was engaged on the frescoes of the Sistine Chapel, in the Borgia apartments of the Vatican, in the Bufalini Chapel and in the Church of Saint Maria in Araceli, being at this time under the influence of Perugino. His chief work was a series of mural paintings illustrating the life of Pope Pius II, in the cathedral library at Siena. He left many exquisite altarpieces and other works in tempera, and he was considered the greatest decorative artist of his time.

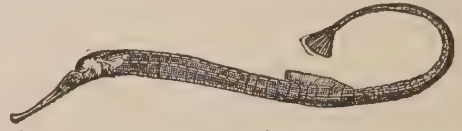
Pipe, a tube for the conveyance of water, steam, gas or other fluid, used for a great variety of purposes in the arts and in domestic economy. The materials of which pipes are made are also various, wood, stone, earthenware, iron, lead, copper, leather and gutta-percha all being employed. Drainage and sewage pipes of great strength and size, measuring from one or two up to fifty-four inches in diameter, are usually made of fire clay and glazed on their outer and inner surfaces. Large iron pipes are usually cast, and are used for the supply of water and gas.

Pipe, **TOBACCO**, a bowl and connecting tube, made of baked clay, wood, stone or other material, and used in smoking tobacco. The chief processes in the manufacture of clay pipes are molding and baking. Finer and more expensive pipes are made of meerschaum, a somewhat plastic magnesian stone, of a soft, greasy feel (See **MEERSCHAUM**). Meerschaum pipe making is carried on to the greatest extent by the Germans, and Vienna may be said to be the center of the manufacture. Sometimes the bowl alone, which is frequently artistically carved, is of meerschaum, the stem being of wood, the best sorts of which are got from the young stems of the Mahaleb cherry, grown near Vienna, the mock orange of Hungary and the jessamine sticks of Turkey. The stem, whether of the same material as the bowl, or of wood, is usually provided with a mouthpiece of ivory, silver or amber, the last being preferred. Brier root pipes, with the bowl and stem of one piece of wood, and provided with amber, ivory or bone mouthpieces, are now very common. They are made of the roots of a large variety of heath. Many Germans prefer pipes with porcelain bowls, which are sometimes beautifully painted in the style of fine chinaware painting. The Eastern *hookah* is

Pipit

a pipe of great size, the bowl of which is set upon an air-tight vessel, partially filled with water; it has a small tube which passes down into the water. The long flexible smoking-tube is inserted in the side of the vessel, and the smoke is made to pass through the water, being thus cooled and deprived of some noxious properties. In America, pipes have been in use from a very remote period. Indian pipes, with elaborately carved soapstone bowls and ornamented wooden stems, or made entirely of baked clay, have been found in the ancient mounds of the West, together with other relics of an unknown race. See **CALUMET**.

Pipefish, a genus of fishes, included in, and nearly allied to, the curious little animals popu-



PIPEFISH

larly known as sea horses. The pipefish is distinguished by a long and tapering body and by its peculiar jaws, which are united to form a tube, or pipe, bearing the mouth at the tip. The largest of the pipefishes is said to attain a length of three feet. A very remarkable fact is that the males of some species possess a pouch-like fold at the base of the tail, in which the young, after hatching, continue to live for a time. Some species are protected by their close resemblance to the blades of eelgrass, among which they abound.

Pipit or **Tit'lark**, a genus of singing birds, which show a close relationship to the larks and



PIPIT

wagtails. All pipits are mainly brown, with dark streaks on the body and light-edged feathers. Their songs are in some cases agreeable; in others, they are too shrill to be pleasant. They live principally on the ground, over which they run swiftly. There are several species to be

found throughout Europe, and in the United States one is familiar during the migrations. The "Missouri skylark," which takes its name from its habit of singing while soaring in the air, is a near relative.

Pip'pin. See PEPIN.

Piqua, *pik'wa*, OHIO, a city in Miami co., 70 mi. s. w. of Columbus, on the Miami River, on the Miami & Erie Canal and on the Cincinnati, Hamilton & Dayton, the Pittsburg, Cincinnati, Chicago & Saint Louis and several electric railways. It is in a rich farming region, has good water power and contains linseed oil, straw-board and woolen mills, a furniture factory, iron works and other manufactories. The city has a high school and the Schmidlapp Library, and it owns and operates the waterworks. Population in 1910, 13,388.

Piquet, *pe ket'*, or, in England, **Picket**, one of the oldest card games now played. It is played by two persons, who use all the cards except the twos, threes, fours and fives. Twelve cards are dealt, two or three at a time to each player, and the cards remaining are placed on the table within easy reach. If no face card is dealt to either player, he scores ten at once, after spreading the cards on the table for his opponent to see. Then the players discard. The one at the left of the dealer must discard one and may discard five cards and take in place of them an equal number from those that have not been dealt. If he discard less than five, he may look at the first five of the stock and make his selection. The dealer discards or not, as he chooses, but he may take all that the other has left, discarding an equal number from his hand. Differences exist among the authorities concerning the rules for discarding. The players score according to certain combinations of cards, which may be learned from any good book on games. Piquet is not played to any great extent in the United States.

Pi'racy, the offense which consists in committing those acts of robbery and depredation upon the high seas, or other places where the admiralty has jurisdiction, which, if committed upon land, would amount to felony only. This offense is punished with death in the United States. Piracy, in the common sense of the word, is distinguished from privateering by the circumstance that the pirate sails without any commission and under no national flag, while the privateer acts under a commission from a belligerent power.

Piræus, *pi re'us*, the principal port of both ancient and modern Athens, situated 5 mi. s. w.

of that city, on a peninsula. It has three harbors, two on the east side and one, the largest of the three, on the west side. Over one-half of the foreign trade of Greece passes through Piræus, which has also manufactures of some importance, including textiles, macaroni, leather and distilled liquors. Piræus was anciently connected with Athens by walls known as the Long Walls. When Greece was freed from Turkish rule, Piræus was largely in ruins. Since then a flourishing city has grown up. Population in 1907, 73,579.

Pisa, *pe'za*, a town of northern Italy, capital of the Province of Pisa, 5 mi. from the Mediterranean and 49 mi. w. of Florence, on both banks of the Arno, which is here crossed by three stone bridges for general traffic and one railway bridge. The city is surrounded by walls and ditches and is defended by a citadel, the fortified circuit having a length of nearly six miles, much of the space enclosed being unoccupied. The river is lined by handsome quays on both sides; the streets are spacious and well paved, and the houses are remarkable for the profusion with which marble has been employed in their construction. In the northwest part of the city is the famous Piazza del Duomo, which contains a remarkable group of buildings, consisting of the magnificent cathedral, which dates from the eleventh century; the baptistry; the Campo Santo, or cemetery, and the famous Leaning Tower (See PISA, LEANING TOWER OF). The city has also a number of notable palaces, an Academy of Fine Arts and a university, which is one of the oldest in Europe. The manufactures of Pisa consist chiefly of silk, woolen and cotton goods. The population, which reached 150,000 when the city was at the height of its power, was in 1911 only 65,232.

Pisa, COUNCIL OF, a general council of the Roman Catholic Church, held to consider the pretensions of the rival popes of Avignon and of Rome, opened March 25, 1409. The rival popes, Benedict XIII (of Avignon) and Gregory XII (of Rome), were summoned to appear within a stated period, but refused to comply. After mature deliberation both popes were formally deposed, and Cardinal Pietro Philargi, archbishop of Milan, was elected. The authority of the council was not, however, generally recognized, and it was not until 1417 that the schism can be said to have terminated.

Pisa, LEANING TOWER OF, the famous campanile of Pisa, which overhangs its base on one side. Its height is 179 feet, and its obliquity, 16½

feet. It was begun in the twelfth century and was completed in 1350. There has been considerable discussion as to whether the slant was accidental or intentional, but it is now generally believed that it was intentional.

Pisces; *pis'seez*, (the fishes), the twelfth sign of the zodiac, into which the sun enters about Feb. 19. The constellation contains some interesting double stars. The symbol of Pisces is X .

Pis'cicul'ture. See FISH CULTURE.

Pisistratus (612-527 B. C.), a tyrant of Athens. By putting himself forward as the patron and benefactor of the poor and by advocating civil equality and a democratic constitution, he was able to seize upon the Acropolis in 560 B. C., and thus to make himself master, or, as the Greeks termed it, tyrant, of the city. But though a tyrant in the Greek sense, his use of power was by no means tyrannical. He made no attempt to abolish the wise laws of Solon, but confirmed and extended their authority. He was, however, twice driven from Athens; but in the eleventh year of his second banishment he succeeded in making himself master of the sovereignty for the third time. Pisistratus erected splendid public buildings at Athens, established a public library, collected and arranged the poems of Homer, and conducted himself with so much prudence and clemency that his country scarcely ever enjoyed a term of greater peace and prosperity.

Pis'til. See FLOWERS.

Pis'tol, a small firearm, discharged with one hand, named from the town of Pistoja, where pistols were first made. Pistols were introduced into England in 1521. Mention is made of their use in 1544. Pistols are made of various sizes, ranging from six to eighteen and even twenty-four inches in length. The modern revolver has replaced the pistol in use.

Pit'cairn, JOHN (about 1740-1775), a British soldier, born in Fifeshire, Scotland. He entered the army in 1765, became a major in 1771 and was stationed at Boston under General Gage. In the spring of 1775 he commanded the British expedition to Lexington and Concord and, it is believed, fired the first shot at the Battle of Lexington. He was mortally wounded in the last charge at Bunker Hill.

Pitcairn Island, an island in the South Pacific, belonging to the Low Archipelago. Its length is about two miles, its width one mile. Its coast is almost perpendicular throughout its whole extent and is fringed with formidable rocks and reefs, accessible at only two points. The soil, naturally fertile, yields potatoes, cocoanuts,

breadfruit, yams, pineapples and other tropical products. The island is chiefly remarkable as the home of the descendants of the "Bounty" mutineers, nine of whom, together with six men and twelve women, natives of Tahiti, landed here in 1790. Violent dissensions soon arose, and at the end of ten years the only survivors were John Adams, an Englishman, eight or nine women and a number of children. Adams succeeded, however, in establishing a well-ordered community. They were found in 1808 by an American sealing ship, and the discovery was reported to the British government. The inhabitants were removed in 1856 to Norfolk Island, but some of them soon returned. The inhabitants number about 115 men and 96 women.

Pitch. See TAR.

Pitcher Plants, plants so named because their leaves are shaped like pitchers. These



SARRACENIA

pitchers generally have honey-secreting glands, which attract insects, and hairs or bristles projecting downwards, which permit insects to crawl down into the pitcher but prevent their escape. The dead insects serve as food to the plant. One well-known American species is the *sarracenia*, found in the swamps east of the Rocky Mountains, especially east of the Mississippi River.

Pit'man, ISAAC, SIR (1813-1897), the inventor of the Pitman system of shorthand, born in Trowbridge, Eng., and educated at London. He

taught school for several years, but in 1837, upon the publication of his *Stenographic Sound-hand*, he began to devote himself entirely to the promotion of shorthand study. In 1842 he established a phonographic journal, a weekly, afterwards called the *Phonetic Journal*, and he continued to edit this paper for more than fifty years. He was an ardent advocate of spelling reform and was instrumental in introducing postage stamps into England. He was knighted in 1894 for his service in the promotion of shorthand writing. See SHORTHAND.

Pitt, WILLIAM, First Earl of Chatham (1708–1778), one of the most illustrious statesmen of



WILLIAM PITT

Great Britain. He was educated at Eton and Oxford, entered Parliament in 1735 and soon attracted notice as a powerful opponent of Walpole. In spite of the king's dislike, Pitt was powerful enough to win a place in the administration, first as vice-treasurer of Ireland and afterward as paymaster-general. In 1756 he became secretary of state and the real head of the government. He was dismissed in 1757, on account of his opposition to the king's policy, but no stable administration could be formed without him, and he returned to power the same year in conjunction with the duke of Newcastle. It was under this administration and entirely under the inspiration of Pitt that Britain rose to a place among the nations which she had not before occupied.

Wolfe and Clive, stimulated and supported in their great designs by Pitt, won Canada and India from the French, and the support Pitt gave Frederick of Prussia contributed not a little to the destruction of French predominance in Europe.

The accession of George III brought Lord Bute into power, and Pitt, disagreeing with Bute, resigned in 1761. In 1766 he strongly advocated conciliatory measures toward the American colonies and undertook to form an administration, in the same year entering the House of Lords as earl of Chatham. But his ministry was not successful, and in 1768 he resigned. After this, his principal work was his appeals for a conciliatory policy toward the colonies. He received a public funeral and a magnificent monument in Westminster Abbey.

Pitt, WILLIAM (1759–1806), an English statesman, the second son of William Pitt, first earl of Chatham. He was educated at Cambridge, was called to the bar in 1780 and entered Parliament the following year. In 1782 he became chancellor of the exchequer under the earl of Shelbourne, and in the following year he attained the position of prime minister, although he was only twenty-four years old. His first measure was the passing of his India bill, establishing the board of control, which was followed by much of that fiscal and financial regulation that made the early period of his administration famous. The establishment of a sinking fund followed in 1786, and his Regency bill was passed in 1788.

The French Revolution then broke out, and in 1793 war arose between Great Britain and France, a conflict which brought a heavy responsibility on Pitt, as well as immense sacrifices and burdens on his country. In 1800 the Irish union was accomplished, but in the following year the opposition of the king to all concession to the Irish Catholics caused Pitt to resign his post. When war again broke out with France, Pitt returned to power and exerted all his energy to render the contest successful. He found means to engage the great military powers of Russia and Austria in a new coalition, which was dissolved by the Battle of Austerlitz. This event he did not survive long. Biographers differ as to his merits as a statesman; some assign him a most exalted place, while others represent him as entirely destitute of great ideas, as a man of expedients instead of principles, as a lover of place and royal favor.

Pit'ti Palace, of Florence, Italy, now a royal residence, one of the most imposing palaces in the world. It was designed in 1440 by Brunel-

Ieschi for the Pitti family. A large portion of it is used as a picture gallery, which contains one of the most important collections of paintings in the world. Many of the most important Florentine and other masters are represented here, such as Andrea del Sarto, Raphael, Salvatore Rosa and Titian.

Pitts'burg, KAN., a city in Crawford co., 130 mi. s. of Kansas City, on the Atchison, Topeka & Santa Fé, the Missouri Pacific, the Frisco and the Kansas City Southern railroads. It is in a rich agricultural region, near valuable coal fields and the mineral deposits of southwestern Missouri. There are large zinc-smelting works, railroad shops, a foundry, machine shops, large brick and sewer pipe works, lumber and flour mills, grain elevators, an ice factory and other establishments. The state Auxiliary Manual Training Normal School, a branch of the state normal school, is located here, and the city has a public library, a large opera house, thirteen churches, two hospitals, four hotels and two national banks. The municipality has paved streets, waterworks, gas and electric lights, electric street railways and suburban electric railroads to the mining camps. The place was settled in 1876, was incorporated in the same year and was chartered as a city of the second class four years later. It became a city of the first class in 1905. Population in 1910, 14,755.

Pittsburgh, PA. the county-seat of Allegheny co., and the second city of the state, situated at the confluence of the Allegheny and Monongahela rivers, 354 mi. w. of Philadelphia, 430 mi. s. w. of New York and 468 mi. s. e. of Chicago, on the Pennsylvania, the Baltimore & Ohio, the Wabash and numerous other railroads. The oldest portion of the city is built on a flat, triangular tongue of land between the two rivers, but this land rises rapidly toward the east, where eminences attaining a height of 400 and 500 feet are found. Several industrial suburbs on the south bank of the Monongahela also constitute a part of the city, together with Allegheny City, across the Allegheny River to the north, formerly a separate municipality, though always industrially and socially closely related to Pittsburgh (See ALLEGHENY.) In the older part of the town the streets follow the directions of the rivers and consequently tend to converge; but in the eastern and residential sections the city is more regularly laid out. Here the streets are broad and well shaded, and they cross each other in most instances at right angles.

About three miles east of the industrial center

is Schenley Park, in the midst of the residential section, with an area of 440 acres. Within the park are the Phipps Conservatory, the Hall of Botany, Music Pavilion and a number of statues. Highland Park, situated on the Allegheny in the northeastern portion of the city, is of about the same area and is noted for its picturesque scenery, for its zoölogical gardens and for the large city reservoirs. There are also a number of other small parks. Schenley and Highland parks and the business district are connected by Grant and Beechwood boulevards.

Among the prominent buildings are the Allegheny courthouse, one of the finest structures of its kind in the Union; the postoffice; the Frick Building, a granite structure 20 stories high; the Farmers' Deposit National Bank, the Carnegie, the Park, the Tradesmen's and the People's Bank buildings. Among the churches worthy of mention are the Saint Paul's Cathedral; the First and the Third Presbyterian churches; Trinity Methodist, Saint Augustine, and Calvary. Of the public institutions the Carnegie Free Library and the Carnegie Institute are the most noted. The charitable institutions include fourteen hospitals, a newsboys' home, a home for working girls, asylums for the deaf and dumb and blind and numerous other institutions, which together cover a wide range of interests. The chief educational institutions are the University of Pittsburgh, Pennsylvania College for Women, the Pittsburgh Female College, the Pittsburgh College of the Holy Ghost, the Carnegie Institute, which contains one of the largest museums in the country, and Carnegie Technical School, a great institution for industrial training. The public library has over 200,000 volumes. In addition to this there are the library of the Western Theological Seminary and the libraries of Western University and other educational institutions.

Located in the iron, coal, petroleum and natural gas regions and within favorable distance of all the leading cities of the Atlantic seaboard and the interior of the country, Pittsburgh has become one of the largest industrial centers in the United States. To-day Greater Pittsburgh contains immense industrial capital. It manufactures more than half of the structural iron and steel, one-fourth of the pig iron, two fifths of the steel and nearly two-thirds of the coke of the country; it makes more steel rails for railroads and more armor plate for battleships than any other city in America. The largest steel car

plant and the largest single group of blast furnaces in the world are within her limits. The forty-one great blast furnaces, as producers of iron, give Pittsburgh the world-famed title, "The Iron City." Almost every known form of glass is made in the city, and it is the largest center for the manufacture of glass in the United States, as well as the greatest plate glass center of the world. Many of the most important inventions in glass making have originated in Pittsburgh. In addition to the industries above named, there are extensive manufactures of airbrakes, locomotives, engines, machinery, foundry and machine shop products, slate, brick, pottery, leather, paper and lumber. Pittsburgh is the third largest lumber market in the United States, with only New York and Chicago superior. More electrical machinery is built in this city than in any other community in the world, and ten thousand persons are employed in that industry alone. The largest works of the United States Steel Corporation are located in and about the city.

The old town was built on the site of Fort Duquesne, erected by the French in 1754. Against this fort Braddock directed his ill-fated expedition in 1755, making his brave, but foolhardy, fight against an invincible and almost invisible foe. Three years later the fort was captured by the British; a new fort was erected and named Fort Pitt, in honor of William Pitt, prime minister of England. The first permanent settlement was made in 1765. From that time it has rapidly increased in population and importance. It became the county-seat in 1791 and was chartered as a city in 1816. The population of the city in 1910 was 533,905, but the aggregate of population of the city and its suburbs is considerably greater than this.

Pittsburg Landing, BATTLE OF. See SHILOH, BATTLE OF.

Pittsfield, MASS., the county-seat of Berkshire co., 50 mi. n. w. of Springfield, on the Boston & Albany and the New York, New Haven & Hartford railroads. The city has a beautiful location among the Berkshire Hills, at an elevation of over 1000 feet, near several picturesque lakes. It is an attractive residence place and a popular summer resort. The principal structures include the Berkshire Athenaeum, containing a large public library and the rooms of the Berkshire Historical Society; the Crane Art Museum; the courthouse, built of white marble, and the buildings of the Berkshire Life Insurance Company and the Berk-

shire County Savings Bank. The city also has a high school, Saint Joseph's Academy, House of Mercy Hospital, a training school for nurses, a home for aged women and three public parks. The Agassiz Association has its headquarters here. There are cotton, woolen and silk mills, the large plant of the Stanley Electric Manufacturing Company, a branch of the General Electric Company, foundry and machine shops, paper mills and manufactures of shoes, electrical supplies and numerous other articles. The place was settled as Boston Plantation in 1743, was incorporated under its present name in 1761 and was chartered as a city in 1891. Population in 1910, 32,121.

Pitts'ton, PA., a city in Luzerne co., 10 mi. s. w. of Scranton, on the Susquehanna River and on the Lehigh Valley, the Erie, the Lackawanna and other railroads. It is in an anthracite region, and coal mining is the principal industry. Fire clay is found in the vicinity, and there are foundries, machine shops, stove and engine works, breweries, brick and terra cotta plants and knitting, flour, paper, lumber and other mills. Pittston is chiefly a commercial and industrial city, while West Pittston, on the opposite side of the river, is more distinctly a residence place. Pittston was laid out and named in honor of William Pitt in 1770 and was chartered as a city in 1894. Population in 1910, 16,267.

Pi'us, the name of ten popes, the most important of whom are the following:

PIUS II (1405-1464), Aeneas Sylvius Piccolomini, was pope from 1458 to 1464. He studied at Siena, subsequently became secretary to Cardinal Capronica and later to Antipope Felix V. Having been sent on an embassy to Emperor Frederic III, he was persuaded to accept office in the imperial court and was made ambassador, successively, to the courts of Milan, Naples and Rome. Calixtus III raised him to the cardinalate. As pope, he founded a military order of knights to defend the isles of the Aegean Sea against the Turks. But he was best known for his literary works, the most interesting of which are his letters. He was one of the most eminent scholars of his age.

PIUS V (1504-1572) was pope from 1566 to 1572. His chief service as pope was to enforce the reform decrees of the Council of Trent. With Spain and France, he organized the Holy League against the Turks, which resulted in the naval battle in the Gulf of Lepanto, October 7, 1571.

PIUS VI (1717-1799), Giovanni Angelo Braschi, held important offices under several pontiffs, was raised to the cardinalate by Clement XIV and succeeded him as pope in 1775. To this pope Rome is indebted for the draining of the Pontine marshes, the completion of the Church of Saint Peter, the improvement of the port of Ancona and other similar works.

PIUS VII (1742-1823), Gregorio Barnaba Chiaramonti, was created bishop of Tivoli by Pius VI and, after being made cardinal was transferred to the bishopric of Imola. His friendly attitude toward the Cisalpine Republic secured him the favor of France and the election to the papal chair in 1800. After his accession he aimed at reestablishing the old order of things, and to gain it he tried to conciliate Napoleon by attending his coronation. He aroused the open enmity of the emperor by refusing to be present at the coronation in Milan and by declining to recognize Joseph Bonaparte as king of Naples. The result was another occupation of Rome by French troops, the incorporation of the papal cities and, shortly after, of Rome itself, with the kingdom of Italy, and the removal of the pope to Florence, then to Grenoble, to Savona and afterward to Fontainebleau. In 1814 he was released and restored to the possession of all the papal territories except those of Avignon and Venaissin in France and a narrow strip of land beyond the Po.

PIUS IX (1792-1878), Giovanni Maria Mastai-Feretti, held various ecclesiastical offices under Leo XII, who appointed him archbishop of Spoleto in 1827 and to the see of Imola in 1832. Although raised to the cardinalate in 1840, he resided in his diocese until his election to the pontificate in 1846. His accession was signalized by the release of 2000 political prisoners, followed by a complete amnesty and by the announcement that Italy was to be free and independent, under a liberal constitution. During trouble with the Austrians, the pope was compelled to leave Rome. A Roman Republic was proclaimed in 1849, with Mazzini at its head. Louis Napoleon, president of the French Republic, sent an expedition to Rome, which defeated the Italian patriots under Garibaldi and occupied the city. The pope returned in April, 1850, but he left the direction of State affairs principally in the hands of his secretary of state, Cardinal Antonelli.

PIUS X (1835-1914), Guiseppe Sarto, the successor of Pope Leo XIII, born at Riese,

Italy, in the Venetian province of Treviso. He was sent from the village school to the college at Castel Franco, then to the central seminary at Padua, where he graduated with much distinction. He was ordained priest in the Cathedral of Castel Franco on Sept. 18, 1858. His first cure was in the parish of Tombolo, from which, in 1867, he was transferred to Salzano and was made parish priest. Eight years later the Bishop of Treviso, recognizing his piety and ability, appointed him not only canon of the cathedral of Treviso and chancellor of the diocese, but the spiritual director of the college. Soon he was made dean of the chapter, and after serving during an interregnum as vicar-general, he was appointed suffragan by the new bishop. He next became bishop of Mantua. In 1893 Leo XIII made him a cardinal and almost immediately afterward created him patriarch of Venice. In 1894 there was considerable anti-clerical agitation going on in Venice. But the new bishop was not long in making himself beloved by all in his patriarchate. He took a deep interest in social questions and threw himself heart and soul into all enterprises for the bettering of the lot of the poor, lending his aid to the institution of rural banks, coöperative societies and benevolent associations. On August 4, 1903, he was elected pope and was crowned in Saint Peter's Cathedral at Rome, Aug. 9.

Pope Pius was known for his sincerity, his generosity and his sympathy with the people. Himself a man of humble birth, he was the most democratic of men. He lived simply, almost frugally, and his manner was characterized by a charming and genuine courtesy. He was a man of great breadth of learning, was an eloquent and convincing speaker, a musician of considerable ability and a connoisseur in art. Although not a politician, according to the ordinary meaning of that word, he possessed great tact and on numerous occasions proved his executive ability. His last illness, an attack of the bronchial catarrh from which he had suffered for years, was aggravated by sorrow over the outbreak of the great European war of 1914. His last message to the world was a prayer for peace addressed to the 250,000,000 Catholics. He died on August 20, 1914.

Pizarro, *pe zahr'ro*, FRANCISCO (1471-1541), a Spanish adventurer, the discoverer and conqueror of Peru. The spirit of adventure, which in his time pervaded Spain, prompted him to seek fortune in the newly-found continent

of America, where he participated in various military and trading expeditions. While resident near Panama, he became associated with two other adventurers, Hernando Luege, or De Lueges, and Diego de Almagro. In 1524 they jointly fitted out an expedition, with a view to exploration and conquest, and on their second voyage they discovered Peru; but finding their force inadequate for conquering the country, Pizarro returned to Spain for assistance. He arrived in Seville in 1528, was granted the necessary powers and a small force and re-crossed the Atlantic in 1531. The following year he arrived in Peru during a civil war, treacherously seized the person of the reigning inca at a friendly banquet and, after extorting an immense ransom, put him to death. The whole empire was gradually conquered without much opposition, but its settlement was long in abeyance, owing to a feud between Pizarro and Almagro. Hernando Pizarro, a brother of the general, strangled Almagro in 1537. This act was avenged when a son of Almagro murdered Francisco Pizarro in his palace at Lima. Lima was founded by Pizarro in 1535, and there his remains are interred in the cathedral, also founded by him. See ATAHUALPA; INCA.

Plague, *playg*, a contagious fever, which brings great prostration, stupor, delirium and, in a large proportion of cases, death. It is caused by a bacillus which has been recognized and found growing in rats and other small animals, and these doubtless carry the infection from house to house (See GERM THEORY OF DISEASE). The plague attacks suddenly and is sometimes fatal within a few hours, but usually it runs its course in three days. If the patient lives until the fifth day, he will probably recover. As characteristic of the disease, livid spots and large carbuncles sometimes appear on the skin and give to the disease the name of *bubonic plague*. There is no specific remedy, though a great variety of treatments have been adopted on different occasions by different medical men. Prevention by proper sanitary measures is the greatest safeguard. The plague appeared in most ancient times, although historians have used the term indiscriminately for other epidemics. The first recorded visitation of the plague to Europe is that at Athens (430 B. C.), described by Thucydides; Josephus records that of Jerusalem, in 72 A. D. Among the most disastrous plagues of antiquity are those of Rome in 262, when 5,000 persons are said to have died daily, and Constantinople, in 544. From the

latter part of the sixth to the twelfth century it ravaged, at intervals, various parts of Europe, particularly France and Germany. In the thirteenth century it was brought to modern Europe by the Crusaders, and from 1347 to 1350 it traversed all Europe and was then called the *black death*. The scourge again claimed its victims in the succeeding centuries, and in 1593 it was brought to England by an army returning from the Continent. London lost by the plague 36,269 lives in 1603; 35,500 in 1625; 13,480 in 1636, and 68,600 in 1665. The plague in Marseilles in 1720 caused the death of over 60,000 in seven months. In 1771 it swept off nearly the whole population of Moscow. In November, 1899, the plague appeared in New York City, and in the next year other cases were reported there and in San Francisco, but there was no extensive spread of the disease in any place. In the same year in the Philippine Islands a number of lives were lost. Physicians feel that the disease can be controlled if the public authorities will take sufficiently active measures.

Plain, a broad expanse of country, with a level or slightly undulating surface and a low elevation. The term should not be applied to areas over a thousand feet in altitude. Plains gradually rise from sea level, on the coasts, to plateaus, in the interior, and in many instances the gradation is so gradual that there is no line of separation between the plain and the plateau. This is seen in the western portion of the great plains of the United States, which rise to an altitude of 2000 feet, in forming the plateau upon which the Rocky Mountains rise.

Plains are formed by the sea, by lakes, by rivers, by ice and by denudation. Those formed by the sea and lakes constitute a good portion of the earth's surface. The most extensive plain formed by the sea is that of Eurasia, which includes most of Siberia and a large part of Russia in Europe. Next to this in size is the Great Central Plain of North America, extending from the Arctic Ocean to the Gulf of Mexico and from the Appalachians to the Rocky Mountains. The Eurasian plain has its greatest extent from east to west and is located on one side of the continent, while the North American plain has its greatest extent from north to south and is located in the interior of the continent. Both are ancient beds of the sea, and their level surface is due largely to the fact that it is formed by the deposit of sediment in standing water. The interior of northern Africa is a great plain and was also formed by the sea. A portion of this consti-

tutes the Sahara. The most noted illustration of plains formed by a lake is that found in the valley of the Red River of the North. This extends from the northern boundary of South Dakota northward as far as Winnipeg. At its beginning it has a breadth of only a few miles, but before it reaches the northern boundary of the United States, this has been extended to a width of over 200 miles, and the area continues to increase until the plain blends with the great plain of the western part of Manitoba. River plains are found along the lower course and at the mouths of rivers (See FLOOD PLAIN; DELTA). Plains by denudation are caused by the action of wind and weather. See EROSION.

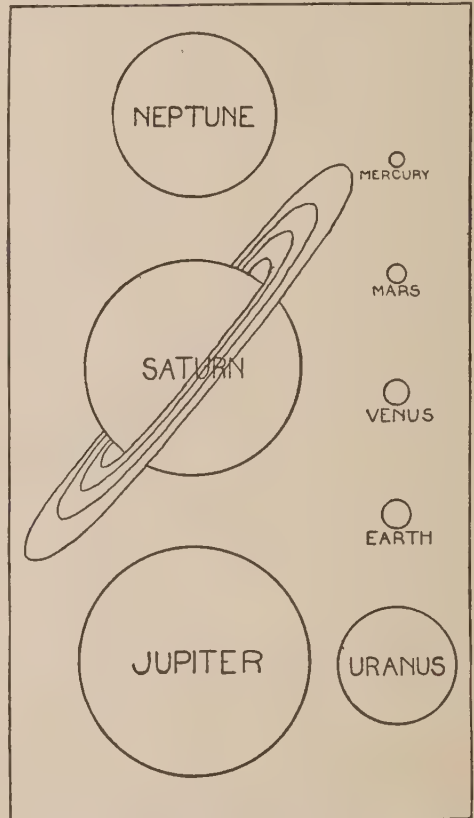
Most plains contain soil of a high degree of fertility, and when located in suitable climates they produce abundant crops. For these reasons such plains have in all ages been the most densely populated regions. The plains of the Nile, the Ganges and the Po, in the Old World, and the Great Central Plain of North America, in the New World, are good illustrations of the economic value of these common features of the earth's surface. See PLATEAU; LLANOS; SELVAS; STEPPES.

Plain'field, N. J., a city in Union co., 24 mi. w. by s. of New York City, on the Central of New Jersey railroad. It is chiefly a residence city, picturesquely located at the base of the steep, wooded ridge known as First Mountain. It has public parks and contains the Muhlenberg Hospital and a public library. There are also manufactures of printing presses, tools, silk and cotton goods, carpets, gloves, clothing and other articles. The place was settled in 1684 and was chartered as a city in 1869. Population in 1910, 20,550.

Plane, in geometry, a surface, such that if any two points in it be joined by a straight line, that line will lie wholly within the surface. If two planes intersect, the line of intersection is a straight line. A plane is determined by three points not in a straight line, by two intersecting straight lines, by a straight line and a point outside of it or by two parallel lines. A plane figure is a portion of a plane bounded by lines, either straight or curved; in the former case the figure is rectilinear; in the latter case it is curvilinear. See MATHEMATICS; GEOMETRY; SQUARE; CIRCLE; TRIANGLE; POLYGON; ELLIPSE; also ARITHMETIC in Volume V.

Plan'et, a celestial body which revolves about the sun as its center, or a body revolving about another planet as its center. The best

known *major planets* are, in order of their proximity to the sun, Mercury, Venus, the Earth, Mars, Jupiter, Saturn, Uranus and Neptune. Mercury, Venus, Mars, Jupiter and Saturn were



RELATIVE SIZE OF PLANETS

known to the ancients. Uranus was accidentally discovered by Herschel in 1781, while the discovery of Neptune was the result of pure intellectual work, the calculating of Leverrier and Adams. The planetoids, or asteroids, are small bodies between the orbits of Mars and Jupiter, discovered since the beginning of the present century. The number of these asteroids that are known is annually increased; nearly 300 have been discovered. Mercury, Venus, the Earth and Mars closely resemble each other in many respects. They are all of moderate size, with great densities; the earth weighs five and a half times as much as an equal bulk of water. They shine only by reflected sunlight. Jupiter, Saturn, Uranus and Neptune, on the other hand, are of enormous size, are of small densities, some of them weighing less than an equal bulk of

Planetoid

water, and probably exist at a high temperature, and give out, in addition to reflected sunlight, a considerable amount of light and heat of their own. The most colossal of the planets is Jupiter; its volume is about 1200 times as great as that of the Earth. Saturn is next in size. Ma.s, Jupiter, Saturn, Uranus and Neptune, being outside the Earth's orbit, are sometimes called the *superior planets*; Venus and Mercury, being within the Earth's orbit, are called *inferior planets*. The family of major planets has also been subdivided into *intra-asteroidal* planets—Mercury, Venus, the Earth and Mars; and *extra-asteroidal* planets—Jupiter, Saturn, Uranus and Neptune, the character of the two being very different, as above described. The planet which approaches nearest to the Earth is Venus, the least distance in round numbers being 23,000,000 miles; the most distant is Neptune, whose least distance is 2,629,000,000 miles.

The following table gives the names of the planets; also, in column I, their distances from the sun, as compared with the earth's distance; in column II, their size as compared with the size of the Earth, and in column III, their periods of revolution around the sun.

	I	II	III
Superior Planets:			
Mars	1.5	.15	687 days
Jupiter	5.2	1164.	11.9 years
Saturn	9.5	783.	29.5 years
Uraus	19.2	66.	84. years
Neptune	30.0	86.	164.8 years
Earth	1.	1.	365½ days
Inferior Planets:			
Mercury	.4	.05	88 days
Venus	.7	.88	224.7 days

To us, the planets sometimes appear to move from west to east, and sometimes they appear stationary. These curious motions puzzled the ancient astronomers, who named these bodies *planets*, or *wanderers*. All their motions, however, became intelligible when the theory of the solar system was advanced (See SOLAR SYSTEM). Neptune, the asteroids and all the satellites except the moon are invisible to the naked eye. Uranus may occasionally be seen. Under an opera glass the moons of Jupiter may sometimes be distinguished. It is easy to recognize the other planets, because they shine with a clear, steady light and do not twinkle as the fixed stars do. See article upon each planet for a description, and NEBULAR HYPOTHESIS, for origin of the planets. See, also, ASTRONOMY, Volume V.

Plan'etoid, one of many small planets which revolve about the sun between the orbits of Mars

Plant

and Jupiter. They are about 270 in number, though others are being discovered from time to time. Ceres, the first known, was discovered in 1801. See ASTEROIDS.

Plane Tree, the name given to a genus of trees, of which several species are common in America. The *American plane tree*, or *button-wood*, abounds in American forests, and in favorable locations it becomes the greatest of the deciduous trees of the United States. It often reaches a height of more than one hundred feet and has a diameter of from ten to fifteen feet. The gray or whitish bark flakes from the trunk. The leaves are large and spreading, and the fruit is a compact ball that hangs prettily from the branches. *Buttonball* and *sycamore* are other common names, but the latter is quite incorrect. The wood in seasoning becomes a dull red color, is fine grained and takes a good polish, but is not durable. There are only six species of the plane tree known, and all but one are American.

Pla'ning Machine, a machine tool for planing wood or metal. For the former purpose, the usual form has a series of cutters on a drum, rotating on a horizontal axis. The board to be planed is made to travel underneath. The cutter drum may be repeated underneath and at the edges, so as to plane all sides at once. In the planing of metals, the object to be planed is fixed on a table that moves forward and backward. At each forward movement the object is brought against a stationary chisel, which removes a narrow strip.

Plant, the general name given to all members of the vegetable kingdom. Scientists believe that all plants have been developed in a natural way from simple cells. The algae are believed to be the oldest plants, the great parent group from which the liverworts arise directly and from which the fungi have degenerated. From the liverworts were developed the mosses, which it is thought have given rise to the ferns, and they in turn have doubtless developed flowering plants; but just what species of ferns have developed into what species of seed plants is not known positively. Many plants are highly developed and have organs especially adapted to accomplish their purposes. For instance, there are roots, to absorb water and food; stems, to support the plant and carry the sap from root to leaves; leaves, to give off oxygen and carbon dioxide and to absorb such matters as are needed in the manufacture of tissue. There are, however, plants so simple

in organization that all these processes are carried on in a single cell.

Plants show as great a variety in their ways of living as in their shapes. Some live independently, while others derive their food wholly or in part from some other plant or some animal. These parasites are not confined to the lower orders of plant life, but are sometimes found as degenerate forms of the highest. Mistletoe and dodder are examples of the latter class. Many species are armed with defensive or protective organs, such as flinty bark, cutting edges, thorns or stinging hairs; others are fitted to capture, hold and even digest insects. Harmless plants sometimes mimic the appearance of dangerous species or are colored so as to be almost indistinguishable from the pebbles or earth upon which they live. More surprising still is the storing of poisons or disagreeable matter in a plant, making it unpleasant for animals to eat; or, the growth of means for retaining a body-guard of ants, which keep plants free from lice and other disturbing insects. The arrangements by which flowers secure cross-fertilization through the agency of insects are among the greatest marvels in nature (See POLLEN).

Plants grow by seeds or by roots and root-stocks, and the methods by which the seeds are scattered are nothing short of marvelous. Some are distributed by means of the wind, the thread-like plumes of the milkweed and dandelion being examples of organs that aid in that way. Some plants break off bodily from the ground and go tumbling over the land. Other fruits are armed with hooks or barbed prickles, by which they attach themselves to wandering animals, and still other fruits are covered by pulpy growths attractive to birds, who aid in the distribution of the hard seeds. The number of seeds produced is in many plants entirely out of proportion to the number that survive. A single orchid has been known to produce 10,000,000 seeds. Some plants have become so highly developed that they are able to adapt themselves to almost all conditions and are known to us as weeds.

For a classification of plants see BOTANY, and for the parts and organs see such titles as FLOWERS; FRUITS; LEAVES; SEEDS; STEMS.

Plant, MORTON F. (1852-), an American capitalist and promoter, born at New Haven, Conn., a son of Henry B. Plant, founder of the Southern Express Company. In 1868 he entered the service of the Southern Express Company at Memphis, and in 1884, the Plant

system of railroads having meanwhile been founded by his father, he became vice-president of the corporation and retained this position until 1902, when the system was merged with the Atlantic Coast Line railroad company, of which he then became a director. He also became the head of a great system of ocean transportation lines, of which his father was founder, and he vastly extended them.

Plantagenet, *plan ta'je net*, a surname first given to Geoffrey, count of Anjou, and said to have originated from his wearing a branch of broom (*planta genesta*) in his cap. This name was borne by the fourteen kings, from Henry II to Richard III, who occupied the English throne from 1154 to 1485. In 1400 the family was divided into the branches of Lancaster and York, and from their union in 1485 sprang the House of Tudor.

Plan'tain, the name of a family which includes several species of well-known weeds. The common, or greater, plantain, has a rosette of light green leaves, from the center of which long, cylindrical spikes, bearing greenish, inconspicuous flowers, are sent up. This perennial weed is often a pest in lawns and gardens, choking the growth of all crops. Another species, known as *bracted plantain*, or *rib grass*, is very abundant through the Middle and Western states. It ripens innumerable seeds, and as these are frequently mixed with grass and clover seeds, the plant is widely distributed.



GREATER PLANTAIN

The name plantain is given to a tree of the East Indies, cultivated in almost all tropical countries for its fruits, which grow in large clusters. These fruits are among the most useful in the vegetable kingdom and are the sole food of many of the inhabitants of tropical regions. The fibers obtained from the leaf-stalk of a species which grows in the Philippine

Islands supplies Manila hemp, from which cordage of the strongest character is made. From the finer fibers a serviceable cloth is woven.

Plant Lice. See *APHIDES*.

Plas'tering is the art of covering the surface of masonry or woodwork with mortar, cement, stucco or plaster, in order to give it a smooth and uniform surface. The wall is generally first covered with laths, or thin strips of wood, with narrow spaces between them. The face of the first coat, which should be of considerable thickness, is troweled, or indented, with cross lines, to form a key for the finishing coats. The second coat is applied when the first is thoroughly dried. It is rubbed in with a flat board, so as thoroughly to fill the indentations and cover the unequal surface of the first coat with a smooth and even one. In plastering walls, great care must be taken to have the surface perfectly vertical. The setting coat, which is of pure lime or, for moldings or finer work, of plaster of Paris or stucco, is applied to the second coat before it is quite dry. A thin coating of plaster of Paris is frequently applied to ceilings after the setting coat. See *CEMENTS*.

Plaster of Paris, the name given to gypsum, when ground and used for making casts and molds. If one part of powdered gypsum be mixed with two and a half parts of water, a thin pulp is formed, which after a time sets to a hard, compact mass. By adding a small quantity of lime to the moistened gypsum, a very hard, marble-like substance is obtained, after allowing the mixture to stand. See *GYPSUM*.

Plata, *plah'ta*, RIO DE LA, a river of South America, which runs for more than 200 mi. between the Argentine Republic and Uruguay. It is not, strictly speaking, a river, but rather an estuary, formed by the junction of the great rivers Paraná and Uruguay. It flows into the Atlantic Ocean between Cape Saint Antonio and Cape Saint Mary, and it has, at its mouth, a width of 143 miles. On its banks are the cities and ports of Montevideo and Buenos Ayres. Navigation is hampered in some parts of the river by shallow water and sand banks. It was discovered in 1515 by Diaz de Solis and was called Rio de Solis; it owes its present name to Sebastian Cabot.

Plataea, *plah'te'a*, an ancient city of Greece, in Boeotia. At the Battle of Marathon the Plataeans aided the Athenians, and for this, Xerxes destroyed their town in 480 B. C. It was

rebuilt, however, and during the Peloponnesian War it remained such a firm ally of Athens that it was taken by the Spartans. In 373 B. C. it was again destroyed by the Thebans. During the time of Alexander the Great it was rebuilt, but it was never again of much importance.

Plateau, *plato'*, an elevated tract of land, with a nearly level surface or one that has been sculptured by rivers. Plateaus are elevated plains and are associated with mountain systems, being found between the upper ranges of the system. They are usually at one side of the continent, and their greatest length follows the front of the mountain ranges. They are hundreds and even thousands of miles in extent. The most noted plateaus of the world are the Rocky Mountain plateau, in the United States; the Andean plateau, in South America, and the plateaus of Tibet and Pamir, in Asia. These latter are the highest and most extensive in the world. Plateaus were formed by the gradual uplifting of the land, and they have risen so gradually from the plains that in many instances it is difficult to determine the line of separation between the plateau and the plain. In some instances plateaus have been sculptured into hills, and the crests of the hills have a common level. In arid regions, canyons cut the plateaus into tablelands (See *TABLELAND*; *BUTTE*; *MESA*). The high plateaus between mountains are usually rude and barren. Some, because of their altitude, have a climate too cold for successful agriculture. This is true of the plateaus of Tibet and Pamir. Others are robbed of moisture by the surrounding mountains, but occasionally streams flow down the sides of these mountains and form fertile deposits known as alluvial fans. Wherever these occur, they have an appearance similar to that of an oasis in a desert. See *MOUNTAIN*; *PLAIN*.

Pla'ting, the coating of a metallic article with a thin film of some other metal, especially gold or silver. As regards plating with precious metals, electroplating has entirely superseded the old Sheffield method, which consisted in welding plates of various metals at high temperatures. See *ELECTROTYPING*.

Platinum, a metal first made known to Europe in 1736. Native platinum occurs mostly in small, irregular grains, generally containing a little iron, and it is accompanied, besides, by iridium, osmium, rhodium, palladium and ruthenium (hence called the "platinum metals") and sometimes by copper, chromium and titanium. It was first obtained in Peru and has since

been found in various other localities, as Canada, Oregon, the West Indies, Brazil, Colombia, Borneo and Asia. The chief supply of platinum ore comes from the Ural Mountains in Siberia. It was there discovered in beds of gold-bearing sands in 1823, and it has been mined by the Russian government since 1828.

Pure platinum is almost as white as silver, takes a brilliant polish and is highly ductile and malleable. It is the heaviest of the ordinary metals and the least expansive when heated. It undergoes no change from the combined agency of air and moisture, and it may be exposed to the strongest heat of a smith's forge, without suffering either oxidation or fusion. Platinum is not attacked by any of the pure acids. Its only solvents are chlorine and nitro-muriatic acid, which act upon it with greater difficulty than on gold. In a finely divided state, it has the power of absorbing and condensing large quantities of gases. On account of its power of withstanding heat and the action of chemical reagents, platinum is much used as a material for making such vessels as crucibles and evaporating dishes, to be used in the chemical laboratory. The useful alloys of platinum are not numerous. With silver, it forms a tolerably fusible white alloy, malleable and brilliant when polished; but it scales and blackens when worked. Gold combines with platinum, and the alloys, in all proportions, are more fusible than the latter metal. Alloyed with iridium (a rare metal of the same group), platinum possesses an excellent and unalterable surface for fine engraving, as in the scales of astronomical instruments. This alloy has also been adopted for the construction of international standards of length and weight. A coating of platinum can be given to copper and other metals by the application of an amalgam of spongy platinum and mercury, the latter being then driven off by heat. Steel unites with platinum in all proportions, and in the proportion of from one to three per cent of platinum, it forms a tough and tenacious alloy, well adapted for cutting instruments. Platinum is extracted from the accompanying substances by several different methods, which are known as *wet* or *dry*. In the wet method, which is the one principally employed, the processes are chemical, while in the dry methods, heat is the chief agent and does not secure pure platinum.

Plato (427-347 B. C.), an eminent Greek philosopher, the founder of the Academic school of philosophy. His real name was Aristocles, but

he was given the name Plato because of his broad brow. Such was his learning and ability that the ancient Greeks declared him to be the son of Apollo and told how, in his infancy, bees had settled on his lips, as prophecy of the honeyed words which were to flow from them. After receiving the education of a noble Athenian youth, Plato came under the influence of Socrates and was his most devoted follower. During the ten years following the death of Socrates, Plato traveled extensively. At the age of forty he returned to Athens and founded the Academy, where for forty years he taught his philosophy (See ACADEMY). His most celebrated pupils were Aristotle and Demosthenes.

Plato is best known for his arguments on the immortality of the soul. He believed in one eternal God and in a previous, as well as a future, existence. He asserted that reality did not belong to individual things, as, *this man*, *this book* or *this tree*, but to the general idea of *book*, *man* or *tree*, and that all general ideas combined formed a unity, God being the supreme, all-inclusive idea. See PHILOSOPHY.

Plato's works were written in the form of dialogues, Socrates being represented as the principal speaker. His style was considered so perfect that it was a common ancient saying that if Jupiter had spoken Greek, he would have spoken like Plato. The thirty-five dialogues ascribed to Plato are in existence, but seven of these are considered spurious by the best authorities. His best-known works are *The Republic*, in which he explains his ideal of a city, which was to be one founded on justice; *Phaedrus* and *The Symposium*, in which he sets forth the doctrines of love, whereby sensuous passion is made the symbol of spiritual exaltation and of all aspirations toward the good, the beautiful and the true, and *The Apology*, a defense of the doctrines of Socrates.

Platt, ORVILLE HITCHCOCK (1827-1905), an American politician, born at Washington, Conn. He received an elementary education, was admitted to the bar in 1849 and began practice at Meriden. He was elected to the state senate and later to the lower house of the legislature, where he served one year as speaker. In 1879 he was chosen to the United States Senate and was four times reelected. He won special fame as the author of the famous Platt Amendment, which was incorporated in the constitution of Cuba.

Platt, THOMAS COLLIER (1833-1910), an American politician, born at Owego, N. Y. He was educated at Yale College and later became

president of Tioga National Bank. He was in the lower house of Congress from 1872 to 1876 and was chosen United States senator in 1881, but he resigned this position on account of a disagreement with President Garfield as to Federal patronage, and he failed of reelection. In 1880 he became president of the United States Express Company and was elected United States senator from New York in 1897 and in 1903.

Plattdeutsch, *plah't doich*, or **Low German**, the language of the North German Lowlands, from the borders of Holland to those of Russian Poland. The Dutch and Flemish languages also belong to the Low German dialects, but, being associated with an independent political system and having a literature of their own, they are reckoned as distinct languages. The Low German dialects agree in their consonantal system, not only with Dutch and Flemish, but also with English and the Scandinavian tongues (See PHILOLOGY). Until the Reformation, Low German was the general written language of the part of the Continent above mentioned; but from the time of Luther's translation of the Bible into High German, the latter has been recognized as the superior literary language. Even as a spoken language, High German has ever since been slowly superseding the Low. In recent times, however, Low German literature has received a new impetus, and its dialects have received a good deal of attention from scholars.

Platte, a river which rises in the Rocky Mountains in two branches, called, respectively, the North Fork and the South Fork. These unite in Lincoln County, Neb., and the Platte River flows in a generally easterly direction and falls into the Missouri River. Its length, including the North Fork, is about 1250 miles. It is from one to three miles broad, is shallow and encumbered with islands and has a rapid current. Therefore it is not useful for navigation.

Platts'burg, N. Y., the county-seat of Clinton co., 167 mi. n. of Albany, on Lake Champlain, at the mouth of the Saranac River, and on two lines of the Delaware & Hudson railroad. It was settled in 1784 and was incorporated the next year. Just to the south is Valcour Island, near which the first naval battle was fought between the British and American fleets, on Oct. 11, 1776. During the War of 1812, the village was the headquarters of the United States forces on the north, and in Plattsburg Bay the British fleet was defeated Sept. 11, 1814, in the Battle of Lake Champlain. In 1849, and again in 1867, a large part of the business section was destroyed

by fire. The village has a picturesque location on Cumberland Bay, which affords a good harbor. In the vicinity are many popular summer resorts. A state normal school is located here, and the municipality has a public library and four other libraries. Other important structures are the Federal building, the courthouse, the jail and the homes for friendless and for aged women. About a mile to the south is a large national military post, known as Plattsburg Barracks. The Catholic Summer School of America convenes at Cliff Haven, two miles south of the village. Plattsburg has a valuable lumber trade and contains lumber mills, a sewing machine factory, foundries, machine shops, flour, woolen and pulp mills and other factories. Population in 1910, 11,138.

Platts'mouth, NEB., a city of Cass co., situated on the Missouri River, at the mouth of the Platte, 22 mi. s. of Omaha, and on the Chicago, Burlington & Quincy and the Missouri Pacific railroads. Its leading industrial establishments include flour mills and railroad shops. It is also an important shipping point for grain and cattle. Population in 1910, 4287.

Plautus, TITUS MACCIUS (about 254-184 B. C.), one of the oldest and greatest of the Roman writers of comedy. We have few particulars of his life. He is said to have been connected with a dramatic company at Rome and then to have engaged in business. But he lost his means, became destitute and was compelled to earn his livelihood by turning a baker's hand mill. While he was thus engaged he wrote three comedies, which were produced at public festivals and which brought him immediate fame. The purity of his language, his genuine humor and his faithful portrayal of middle and lower class Roman life made him a great favorite with the Roman public, and his plays successfully held the stage for some centuries. He was much admired by Cicero and Varro. For his characters, plots and scenes, he was chiefly indebted to the comedy writers of Greece; but the language was his own, and the plays were made thoroughly Roman. Twenty of his plays have been preserved, among which are *Amphitryon*, *The Captives* and *The Twins*.

Plebeians, *ple be'yanz*, the common people of ancient Rome. They were at first excluded from nearly all the rights of citizenship. The whole government of the state, with the enjoyment of all its offices, belonged exclusively to the patricians, with whom the plebeians could not even intermarry. The civil history of Rome is to a

great extent composed of the struggles of the plebeians to assert their claim to the place in the commonwealth to which their numbers and social importance entitled them, and their efforts were crowned with complete success in the third century B. C. From this time the privileges of the two classes may be said to have been equal.

Plehve, WJATSCHESLAW KONSTANTINOVITSCH VON (1848-1904), a Russian minister of the interior. He was the son of a poor nobleman, but was patronized by a wealthy aristocrat, and when of age he became, successively, imperial counsel at Warsaw, procurator at Saint Petersburg, chief of state police, assistant minister of interior and, in 1902, minister of interior. He had a reputation for great severity toward the dependent peoples of Russia. Plehve was assassinated at Saint Petersburg, July 28, 1904.

Pleiades, *ple'ya deez*, the so-called "seven stars" in the neck of the constellation Taurus, of which only six are visible to the naked eye of most persons. They are regarded by Mädler as the central group of the Milky Way. Ancient Greek legends derive their name from the seven daughters of Atlas and the nymph Pleione, fabled to have been placed as stars in the sky, and the loss of the seventh was variously accounted for. In reality the cluster consists of far more than seven stars.

Pleura, *plu'ra*, **THE**, a serous membrane, one layer of which, the *visceral*, invests the lungs and separates the lobes from each other, and the other, the *parietal*, adheres to the surface of the chest walls. In a healthy condition, these layers are in contact, and during respiration they move freely upon each other, a lubricating fluid being secreted that prevents friction. The pleura serves to hold the lungs, and to a lesser extent the other organs of the chest, in position, and it makes easy the movement of the parts necessary to respiration. See **PLEURISY**.

Pleurisy, *plu're sy*, a disease arising from the inflammation of the pleura, or the membrane which covers the lungs. The first symptoms are usually chills, fever, a sharp pain in the side or chest, and a dry cough. The pain gradually increases until the slightest movement, especially breathing, causes the greatest suffering. In most cases a peculiar liquid passes into the pleural cavity, causing the growth of bacteria, which sometimes set up violent and even fatal complications. Usually, however, the amount of the fluid is so small that it is quickly absorbed. Relief immediately follows, and complete recovery

takes place within a few days. Occasionally an operation is necessary.

Pliny the Elder (23-79), a Roman writer, whose real name was Caius Plinius Secundus. He went to Rome at an early age and, having means at his disposal, availed himself of the best teachers. He served with distinction in the field and, after having been made one of the augurs of Rome, he was appointed governor of Spain. Every leisure moment was devoted to literature and science, and his industry was so great that he collected an enormous mass of notes, which he utilized in writing his works. He perished in the eruption of Mount Vesuvius, which overwhelmed Pompeii and Herculaneum in 79, and his death is described in two letters of Pliny the Younger, his nephew and adopted son. The only work of Pliny which is now extant is his *Natural History*, a work containing a fund of information on physics, astronomy, geography and meteorology, as well as natural history proper.

Pliny the Younger (62 A. D.-?), a nephew of Pliny the Elder; his full name was Caius Plinius Cecilius Secundus. Having lost his father at an early age, he was adopted by his uncle, and he inherited the latter's estates and manuscripts, as well as his habits of industry and love of literature. He filled several public offices and was consul in 100. In 103 he was appointed *propraetor*, or governor, of Pontica, and this office he administered for almost two years, to the general satisfaction. He was one of the most distinguished and best men of his age. The time of his death is unknown, but it is supposed that he died about the year 115. As an author he attempted both prose and poetry, but of his writings, only a collection of letters, in ten books, and a panegyric on Trajan remain.

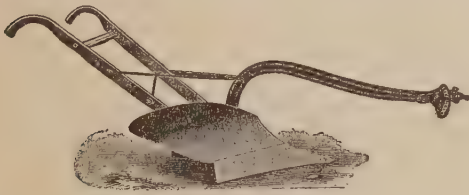
Pliocene, *pli'o seen*, **Epoch**, the name of that portion of geologic time constituting the last division of the Tertiary Period. The formations of the Pliocene epoch are of great importance in Europe, but they are found only in small areas in the United States, the most important one being near San Francisco. The life of the Pliocene epoch was similar to that of the present time. Such animals as the llama, the camel, the horse, the mastodon, the rhinoceros and the tiger inhabited North America, and the animals of Europe resembled some of the species now found in Africa. See **TERTIARY PERIOD**.

Plover, *pluv'ur*, the common name of several species of wading birds, which inhabit all parts of the world. They are round-bodied, plump,

Plow

and usually good game birds. Their bills are much like those of pigeons. The birds are usually to be seen in flocks along muddy borders of rivers and in marshy tracts, where they live on worms and aquatic insects, though some species prefer dry sandy shores and stubble fields. Their classification is difficult, as the species grade one into another almost imperceptibly. The *golden plover* of Europe and Asia has black plumage, spotted with white and yellow on the back. In summer it is found as far north as the arctic regions, and in winter, crossing the Torrid zone, it goes as far south as Patagonia. The American *kildeer* is a pretty little plover with a black collar. The New England species, called the *wrybill*, has a bill bent sharply to one side, enabling the bird to pick up insects from round stones. The ring plover, common on British coasts, has a light brown back and wings, a white crown and a white throat and breast, with a narrow black ring about the neck.

Plow, an implement used by farmers to break up the soil and turn it over. The earliest plows



PLOW

and those still in use in some countries of the Far East were pointed sticks, which were drawn by men or animals. The important parts of the modern plow are the moldboard, for turning over the soil; the beam, to which the other parts are attached and by which the plow is held; the stilts, or handles; the knife, or colter, which cuts the turf and roots; the share, which tears up the soil, and the landslide, which runs next to the land not cut by the furrow. Formerly the beam and handles were made of wood, but now all parts of the plow are made of iron and steel. A small truck is often attached to the forward end of the beam, for the purpose of regulating the depth of the furrow. Plows are manufactured in a great variety of styles, to suit the different purposes for which they are intended.

The *sidehill* plow has the moldboard and share fastened to the beam by a joint, so that they can be swung from one side to the other, thus enabling the plow to move forth and back, turning furrows in the same direction. *Sulky*, or *wheel*, plows rest upon two wheels, to which is attached

Plush

a seat for the driver. The wheel running in the furrow is usually larger than the other. These plows have two or more shares attached to the frame, thus forming a *gang*. They are extensively used in plowing land upon large farms on the prairies. The *steam* plow is hauled by a traction engine, but the weight of the engine so compacts the soil as to injure its productiveness, and this, combined with the expense of the outfit, makes these machines an unprofitable investment. More plows are manufactured in the United States than in any other country, and American plows are found in all parts of the world where agriculture is an important industry.

Plum, a stone fruit, closely related to the peach and the apricot. The common *garden plum*, introduced from Asia Minor, is the most extensively cultivated, and its fruit is one of the most familiar of the stone fruits. The varieties are very numerous, differing in size, form, color and taste. Some are eaten fresh, some are dried and sold as prunes (See PRUNE), while others are preserved in sugar, alcohol, syrup or vinegar. Plums also make excellent jams and jellies, and the syrup from stewed plums forms a refreshing drink for invalids. Perhaps the most esteemed of all varieties is the *green gage*. A very popular and easily grown sort is the *damson*. The wood of the plum tree is hard, compact, traversed with reddish veins and susceptible of a fine polish, and it is employed by turners and cabinetmakers.

The *sloe*, or *blackthorn*, is a species of wild plum that bears a small, round, blue-black and extremely sour fruit. Its juice is made into prune wine, which is chiefly employed by distillers and wine and spirit merchants, for coloring, purifying and mellowing alcoholic liquors.

Plumba'go. See GRAPHITE.

Plum'met or **Plumb Line**, a leaden or other weight, let down at the end of a cord, to regulate any work in a line perpendicular to the horizon or to sound the depth of anything. Masons and carpenters use a plumb line, fastened on a narrow board or plate of brass or iron, to judge whether walls or other objects are perpendicular, or *plumb*. Near a range of high mountains the plumb line is not perfectly true, but is deflected toward the mountains by the attractive power of the mountain-mass.

Plush, a fabric very much like velvet, but with a longer and softer nap. It is made of worsted, with a mohair pile, or cotton, with silk pile. Worsted plush is used in making cloaks, caps and other articles of wearing apparel; that with a silk

pile is used for men's silk hats and for ornaments on women's hats and dresses. Worsted and mohair plush is used for upholstering furniture. London, Lyons and various cities in Germany are especially noted for the manufacture of plush.

Plutarch, *plu'tahrk*, (about 46-about 125), a Greek biographer and essayist, born at Chaeronea in Boeotia, where he also died. It appears from his writings that he visited Italy, lectured there on philosophy and stayed some time at Rome during the reign of Vespasian. His *Parallel Lives of Illustrious Greeks and Romans* is the work to which he owes his fame. The lives are nearly all written in pairs, one Greek and one Roman, followed by a comparison of the two, and they are models of biographical portraiture. We have numerous editions and translations of them. Plutarch's other works, about sixty in number, are generally referred to as *Moralia*, and consist of essays on philosophical and ethical subjects. His writings show that he was well acquainted with the literature of his time and with history, and that he must have had access to many books.

Plu'to, in classical mythology, the god of the lower world, the ruler of the dead. He was the son of Saturn and Rhea, and the brother of Jupiter and Neptune. It was by lot that the under world was given to him as his share of the universe, but he was peculiarly fitted for that post, as he possessed an exceedingly gloomy and taciturn nature. His wife was Proserpina, whom he had carried off in his black chariot. Pluto was greatly feared by the Greeks and Romans, and one of their prayers was that they might never see his face, as it was believed that he never appeared on earth except to find victims to take with him to his



PLUTO AND CERBERUS

gloomy kingdom. Cerberus was the monster dog that guarded the entrance to the lower regions.

Pluton'ic Rocks. See IGNEOUS ROCKS.

Plu'tus, in Greek mythology, the god of riches. Jupiter struck him blind because he confined his gifts to the good, and thenceforth he conferred them equally on the good and the bad. His residence was under the earth. He was often confounded with Pluto.

Plymouth, *plim'uth*, a seaport, municipal and Parliamentary borough of England in Devonshire, at the head of Plymouth Sound, between the estuaries of the Plym and the Tamar. It is well defended, both seaward and landward, by a series of strong forts. The most notable buildings of the city are Saint Andrew's Church; Charles Church, built in honor of Charles I; the guildhall and the municipal buildings. There are numerous charitable and educational institutions. The two harbors of Plymouth give access to the largest vessels, and the city has a large export and coastwise trade. Tin, lead, copper and granite are exported in large quantities. The manufactures of the town are not very important and are chiefly connected with ships' stores, but the fisheries are valuable. The chief importance of Plymouth lies, however, in its position as a naval station. It was from Plymouth that Drake set out on his expedition to sail around the world, and the *Mayflower*, on starting for America, touched at Plymouth, from which she finally set sail in September, 1620. Population of Plymouth proper in 1911, 112,030; of the Three Towns, as Plymouth, Stonehouse and Devonport together are known, 198,000.

Plymouth, MASS., the county-seat of Plymouth co., 35 mi. s. e. of Boston, on Plymouth harbor, a part of Massachusetts Bay, and on the New York, New Haven & Hartford railroad. It was here that the Pilgrims settled in 1620 (See PILGRIMS). Some of the special features of interest are Plymouth Rock, on which tradition says they first landed; Pilgrim Hall, where books, pictures and other relics of early days are kept; Cole's Hill and Burial Hill, which contain the graves of many settlers, and the large national monument to the Pilgrims, composed of a statue of Faith, surrounded by figures of Morality, Law, Education and Freedom. The town contains Morton Park and a public library, and owns the waterworks. The harbor is large, but shallow, and there is some coasting trade. A number of vessels are employed in the fisheries. The town contains manufactures of cordage,

Plymouth

woolen and knit goods, nails, tacks, electrical supplies and other articles. The beautiful and historic situation attracts many tourists. Population in 1910, 12,141.

Plymouth, PA., a borough in Luzerne co., 4 mi. w. of Wilkesbarre, on the Susquehanna River and on the Delaware, Lackawanna & Western railroad. The mining of anthracite coal is the principal industry, and there are also manufactures of mining tools, hosiery, silk and other articles. It has public and parish schools, a high school and a national bank. The place was settled by the Susquehanna Company in 1768. Population in 1910, 16,996.

Plymouth Colony, a settlement made at the present site of Plymouth, Mass., in 1620, by a party of English Separatists, who had lived for twelve years in Holland. The party arrived in the *Mayflower*, November 11, and disembarked December 21, on Plymouth Rock. They suffered terribly from starvation, exposure and disease during the following winter and lost some of their most valued leaders, including John Carver, the first governor. He was succeeded by William Bradford, who for more than thirty years was the leader in the colony. For later history, see MASSACHUSETTS, subhead *History*.

Plymouth Rock, the rock in the harbor at Plymouth, Mass., which is said to have been the



PLYMOUTH ROCK

first landing place of the Pilgrims in 1620. It is now protected by an ornamental iron railing and a granite canopy.

Pneumatic, new mat'ik, Dispatch', a system of sending mail and packages of merchandise through tubes, by means of the pressure of air. The apparatus consists of a tube or series of tubes, air-tight cylindrical carrying cases and an air compressor. The cases are forced through the tube either by the increase of the pressure of

Pneumatic Tires

the air back of the carriage or by the exhaustion of the air in front of it, which creates a partial vacuum. Pneumatic dispatch is particularly useful in sending mail between the central post-office and suburban stations in a large city; also, for collecting and distributing telegraphic messages. However, it has never been extensively used in the United States. The postoffice authorities have established systems in Philadelphia, New York and Chicago, and the Western Union Telegraph Company uses the system in most cities for collecting and distributing messages. Many large retail stores employ a similar system for carrying cash.

Pneumatics, that branch of physics which treats of the mechanical properties of gases. Pneumatics treats of the weight, pressure, equilibrium, elasticity, density, condensation, rarefaction, resistance and motion of air; it treats also of air considered as the medium of sound and as the vehicle of heat and moisture. It also comprehends the description of those machines which depend chiefly for their action on the pressure and elasticity of air, as the various kinds of pumps and artificial fountains. See AIR PUMP; PUMP.

Pneumatic Tires, circular, rubber tubes, inflated with air, placed on the wheels of vehicles, especially bicycles, automobiles and fine carriages, for the purpose of lessening jars and jolts and of reducing noise. The rubber used for pneumatic tires comes to the factory in large lumps, known as "hams." These lumps of crude rubber are cleaned and made into sheets. They are then taken to the drying room, where they are subjected to a temperature of 90° for about 24 hours. The gum used for the inner tubes is left more nearly pure than that used for any other purpose. The gum and other ingredients are passed between a pair of smooth, hollow, iron rollers, running at different rates of speed. When the compound has been thoroughly warmed by this friction, it comes from the rollers in a smooth, semi-transparent sheet of delicate, chocolate tint. The sheet is then carried to the calenders, where it is drawn down to a still thinner sheet. At the same time it is cut to the width required for making a tire. It is then rolled up on a wooden core, with a sheet of muslin between the layers of rubber. Next the rubber goes to the tube room, where it is cut into proper lengths for a tube. The strips are then rolled into shape, after both surfaces have been covered with soapstone. A nozzle is attached to the end of the tube, and soapstone is blown through

it to prevent adhesion of the inner surface. The tubes are then inspected and cut into the exact lengths and the ends are closed up. In the curing room the tubes go into a heater, where they are subjected to a pressure of forty pounds for about four hours. The stems, through which the tires are to be inflated, are set on with a rubber solution. Then the tires are subjected to a final inspection, the valves are put into the stems and they are tied.

The casing stock, from which the outer part of the tire is made, is mixed by a different process from that used for the tube stock, but the process of making the tube is the same. The "friction cloth," which forms the inner part of the outer tube, is made of strong duck. It is passed through a calender, which presses rubber, mixed by still another secret process, upon both sides and into the meshes of the cloth, under enormous pressure. This friction cloth is cut into diagonal strips, just half the length necessary for a tire.

In the building room, two strips of friction cloth are laid on a bench with a little groove down the center. A steel mandrel, the size of the tire, is lifted on the bench and rolled down the groove, the friction cloth being taken up and rolled around the mandrel as it rolls. The mandrels are warm and are painted with a solution of soapstone, to prevent the rubber from sticking. A strip of casing stock is then laid down over the groove on the bench, and the mandrel, covered with the friction cloth, is rolled back the other way, the builder gathering up the casing and pressing it upon the friction cloth until it adheres smoothly upon the outer surface. From the builders the mandrels and tubes go to the press room, where they are put in large iron molds and subjected to heavy pressure and heat. They are then taken out and thrown upon a bench, where a slit about six inches long is cut on the inner side of the tubes. The mandrels are then drawn out. The casings then go to the trimmers and to the perforator, who add the finishing touches. The next process is to draw the tubes through the casing. The tires are then inflated, taken to the storage room and made ready for shipment.

Pneumatic Tools, tools operated by compressed air. Most pneumatic tools are hand tools, and the mechanism for operating them is placed in the handle. They are divided into two classes—those which work as hammers and those which have a rotary motion. To the first class belong the hammer proper, chip-

ping tools, rock drills, riveting machines and caulking machines. The rotary tools include various kinds of boring machines for metal and wood. The tools of the first class are used in metal working and in carving wood. The air is conveyed to the handle by a flexible hose and usually has a pressure of from 80 to 90 pounds to the square inch, except for riveting machines, in which it has a pressure of about 125 pounds to the square inch. The speed and force with which the tool operates are controlled by means of a valve in the handle.

Pneumonia, *new mo'ne a*, an infectious disease of the lungs, caused by minute bacteria. Pneumonia is apt to attack people who are in a weakened physical condition. It begins with a chill, followed quickly by fever, which lasts usually to the tenth or eleventh day, when a distinct crisis occurs, after which, if it is safely passed, the patient recovers. Death comes from heart failure, due to the poisonous products of the bacteria. It is not possible to cut short the duration of the attack by medical treatment, but much may be done to keep up the patient's strength, to stimulate and support the action of the heart and to reduce the temperature in the fever. In the final stage, too, assistance may be rendered in bringing up the waste matter which is cast off by the lungs. Unlike many of the bacterial diseases, one attack of pneumonia does not render a person immune from another, but it seems rather to leave a tendency to a recurrence of the disease.

Po, the largest river of Italy. It rises on the confines of France and Piedmont, in Monte Viso, divides the great plain of Lombardy into two nearly equal parts and receives the waters of the streams flowing south from the Alps and north from a part of the Apennine range. Among its principal tributaries are the Ticino, the Adda, the Oglio, the Mincio, the Trebbia and the Penaro. The chief cities on the banks are Cremona, Piacenza and Turin. The Po, in spite of embankments, is the cause of frequent inundations, especially near its mouth. In some places, owing to the silt carried down, its channel is raised above the country through which it flows. There is also an extensive delta at its mouth. The river is abundantly supplied with fish.

Pocahontas (1595–1617), daughter of the Indian chief Powhatan, of Virginia. Some romantic incidents are told of her life, but there seems to be reason for doubt as to their truth. She is said to have shown a great friendship for

the English who colonized Virginia and to have saved the life of John Smith by throwing herself between him and his executioner, when Smith was about to be put to death by the Indians. Two years later she is said to have frustrated a plot to destroy Smith and his party. After Smith had left the colony she was kept as a hostage by an English expeditionary force, and during this detention she married John Rolfe, an Englishman, who in 1616 took her on a visit to England, where she was baptized and assumed the name of Rebecca. She left one son, who was educated in London, and whose descendants are said to exist still in Virginia.

Po'catel'lo, IDAHO, the county-seat of Bannock co., 134 mi. n. by w. of Ogden, Utah, on the Port Neuf River and on two divisions of the Oregon Short Line railroad. The surrounding region, which is of volcanic origin, has been made very productive by means of irrigation. Mining, stock raising and agriculture are the leading industries. Electrical power is generated at the American Falls, on the Snake River, and the city has large railroad shops, machine shops, stockyards and other establishments. In size it is the second city in the state, and it conducts a large trade in live stock and farm produce. The Academy of Idaho, a state institution, is located here. The city is laid out with well-graded streets, lined with shade trees. Since 1900 the city has had a rapid and substantial growth. Population in 1910, 9110.

Poe, EDGAR ALLAN (1809-1849), an American poet and story writer, born at Boston. On the death of his mother, when he was but two years old, Poe was adopted into the family of Mr. John Allan, of Richmond, Va. He was given a good education and was sent, finally, to the University of Virginia, from which, however, he was withdrawn by Mr. Allan, perhaps because of losses at gambling. After serving for two years in the United States army, Poe was sent to West Point, but was soon dismissed in disgrace. This caused a final rupture with Mr. Allan, and Poe was put upon his own resources. He married, in 1833, his young cousin, Virginia Clemm, and soon afterward he became connected with a magazine in Richmond, to which he contributed tales, poems and literary criticisms. He did not hold this position long, however, and the same was true of positions which he secured on other magazines. The long illness of his wife, whom he loved devotedly, and her death in 1847 prostrated Poe, and from this time he drank more and more frequently. In

October, 1849, he was found unconscious in a drinking place in Baltimore and was taken to a hospital, where he died.

Poe's fame rests chiefly on his poetry, which is unsurpassed in its musical rhythm and its



EDGAR ALLAN POE

marvelously effective combinations of sounds. The best known of his poems are *The Raven*, *The Bells*, *Annabel Lee*, *Ulalume* and *To Helen*. The perfect art of the tales, of which *The Fall of the House of Usher*, *Ligeia*, *The Masque of the Red Death* and *The Gold Bug* are typical, marks Poe as one of the masters of short story telling.

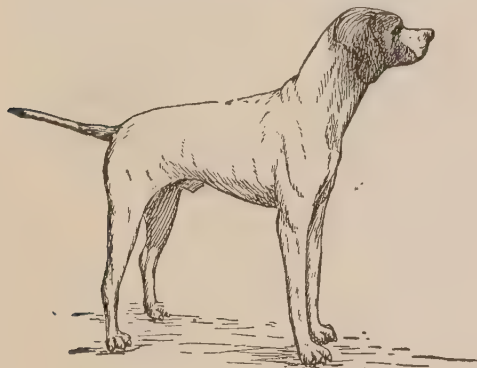
Poet Laur'eate. See LAUREATE, POET.

Po'etry, in its widest sense, any artistic productions of the human mind expressed in language, but in a narrower and more common sense, an artistic production in rhythmical or metrical language. It is the earliest form of literature and also the final and ideal form of all pure literature, its true place lying between music and prose. The two great classes of poetic impulse are dramatic imagination and lyric imagination. Partaking of the character of both is epic, or narrative, poetry. To the dramatic class belong tragedy and comedy; to the lyric belong song, hymn, ode, elegy, sonnet and ballad, though the last named frequently has a kind of epic character. Other forms,

such as didactic poetry and satirical poetry, are also in use, but it is a question whether they enter into the circle of poetry at all. For the various kinds of poetry see **DRAMA**; **LYRIC POETRY**; **EPIC**; **BALLAD**; **SONNET**; **ODE**; **ELEGY**.

Poincare, **RAYMOND** (1869-), French statesman, born at Bar-le-Duc, where he was educated. He was minister of public instruction in 1893 and 1895; in 1894 and again in 1906 he was minister of finance. In 1912 he became premier of France, and a year later was elected president of the Republic. Poincaré was for years one of the leading lawyers of France, a popular orator and an author of distinction, and in 1909 he was elected to the French Academy.

Pointer, a hunting dog, of the hound group. It is smooth and short-haired, generally marked black and white, like the fox hound, and it has a large head, big drooping ears and a slender



POINTER

pointed tail. It receives its name from the fact that when it discovers a bird it stands still, holds its breath and points with its head in the direction of the game. Pointers do not like the water.

Point Levi, *la ve'*. See **LEVIS**.

Poison, *poi'z'n*, any substance which, introduced into the body, produces dangerous or deadly effects. Many poisons operate chemically, eating or corroding the tissues and causing inflammation and mortification. Examples of these irritants are many metallic oxides and solids, such as arsenic; many preparations of copper, mercury, antimony and other metals; the mineral and vegetable acids, and substances derived from some plants. Other poisons exercise a powerful action upon the nerves and cause the rapid destruction of their energy. These are acids or narcotic poisons, and most of them belong

to the vegetable kingdom; opium, hemlock, henbane and belladonna are the best-known forms. Prussic acid, obtained from the kernels of such fruits as the lemon and cherry laurel, is one of the most rapid and deadly. From the monkshood, or aconite, a substance is extracted so poisonous that one-sixteenth of a grain has proved fatal. Some things, such as illuminating gas or the suffocating vapors from sulphur and charcoal, cause death by making breathing impossible. The effect of poisons depends on the extent of the dose, some of the most deadly poisons being useful remedies, if taken under proper conditions and in right quantities.

In treating all cases of poisoning, three things should be remembered: first, to neutralize the poison as quickly as possible by an antidote (See **ANTIDOTE**); second, if the poison has been introduced by way of the stomach, to empty and wash that organ as quickly as possible; third, to overcome the action of whatever poison may have been absorbed into the system by stimulating the life-forces in natural ways. The stomach may be emptied by means of an emetic, but this should not be used if the poison has a strongly corrosive effect and it is feared that the tissues of the stomach have been injured. The most useful emetics are warm water and mustard, large quantities of warm milk, oils, butter, lard, soapsuds or a weak solution of salt and water. The emetic that is most available and will act most quickly is the one to use. If the poison was an irritant, the alimentary canal should be protected by giving such fluids as flaxseed tea, the white of eggs, milk and barley water. If the poison entered by way of a wound, as in case of a snake bite or dog bite, the first step should be to cleanse the wound. If there are no cuts or sores in the membranes of the mouth, the wound may be safely emptied by sucking it, providing the contents are quickly spit from the mouth and that organ thoroughly washed. A tight bandage should be promptly placed above the wound, which ought to be seared with a heated iron or some other cautery. In all cases, a physician should be summoned as quickly as possible, and his directions should be carefully followed.

Poison Ivy, a climbing or trailing shrub, sometimes erect, with aerial roots and groups of three leaflets, each notched and generally pointed. This plant is often confused with the Virginia creeper, which it closely resembles, but which has five leaflets, instead of three. The poison ivy spreads very rapidly by means

of its roots and seeds, and it is a very poisonous weed. It blooms in the heat of the summer, having yellow flowers about a quarter of an inch in diameter. The only means of destroying it seems to be by repeated grubbing. See SUMAC.

Poisonous Plants, a term applied to plants which are poisonous to the touch or when taken into the stomach. The name cannot cover a definite class of plants, because some plants that seem poisonous to one person are harmless to another; some plants that are poisonous when growing are harmless when cooked; some plants are eaten by animals and are feared by people. The poisonous juices of many plants make valuable medicine when properly prepared.

In North America there are several plants generally considered poisonous to the touch, among which are poison ivy and poison sumac, both of which to some persons are poisonous and



POISON IVY

to others are harmless, and the *Virginia creeper*, or five-leaved ivy, which, usually harmless, is noxious to some persons. There are many other plants scattered through different families, from fungi to the highest types of seed-bearing plants, which, if eaten, cause illness or even death. The mushrooms are probably the most dangerous, because of the resemblance between the poisonous and the edible species. Among the flowering plants which are poisonous are black nightshade, belladonna, henbane, poison hemlock and water hemlock. Among other plants of similar properties to be found in North America are hellebore, pokeweed, digitalis, lobelia and aconite.

Poitiers, *pwah tyah*, a town of France, capital of the Department of Vienne, on a peninsula formed by the junction of the Clain and the Boivre rivers, 58 mi. s. w. of Tours. Its chief building is its twelfth-century cathedral, in the Gothic-Romanesque style of architecture. Poitiers is one of the oldest towns of France and has the vestiges of a Roman palace, of Roman baths and of an aqueduct. There is a university in the town and a municipal library of 65,000 volumes. Two famous battles were fought in its vicinity, one, the battle in which Charles Martel defeated the Saracen army, in 732; the other, that between the French, under John II, and the English, under the Black Prince, in 1356. Population in 1911, 41,242.

Poker. See DRAW POKER.

Pokeweed, a large plant, common in North America. It is known, also, by the names of *garget*, *pigeon berry* and *shoke*. The poke has purple stems and large, loose spikes of berries, which are filled with a brilliant crimson juice. The young shoots are used for medicinal purposes, but the roots are poisonous.

Poland, an extensive territory of central Europe, which existed for many centuries as an independent and powerful state, but which, having fallen a prey to internal dissensions, was violently seized by Austria, Prussia and Russia, partitioned among these three powers and incorporated with their dominions. In its greatest prosperity it had at least 11,000,000 inhabitants and an area of over 350,000 square miles. For the physical features of the country, see RUSSIA.

HISTORY. The Poles, like the Russians, are a Slavonic race, and are first spoken of in history as the Polani, a tribe or people between the Vistula and the Oder. The country was divided into small communities until the reign of Mieczyslaw I (962-992), of the Piast dynasty, who renounced paganism in favor of Christianity, and who was a vassal of the German emperor. He was succeeded by Boleslaw the Brave (992-1025), who raised Poland into an independent kingdom and increased its territories. In succeeding reigns the country was involved in war with Germany, the heathen Prussians, the Teutonic Knights and Russia. For a time it prospered, on the whole, but an invasion by the Mongols in 1240 and 1241 brought it to a critical condition. Instead of a united kingdom, the country was now but a collection of independent principalities, which were constantly at war with one another. Under Ladislas I

(1306-1333) Poland became again a united realm. The last of the Piast dynasty was Casimir the Great (1333-1370), during whose reign the material prosperity of Poland greatly increased.

He was succeeded by his nephew, Louis the Great, king of Hungary, whose daughter, Hedwig, was recognized as queen in 1384. She married Jagello, prince of Lithuania, and thus established the dynasty of the Jagellons, which lasted from 1386 to 1572. During this period Poland attained its most powerful and flourishing condition. Sigismund I (1506-1548) was one of the greatest kings of the line, and he brought the country to its highest point of prosperity. In 1572 the Jagellon dynasty became extinct in the male line, and the monarchy, hitherto elective in theory, now became so in fact. The more important of the elective kings were Sigismund III (1587-1632), Ladislas IV (1632-1648), John Casimir (1648-1669) and the Polish general Sobieski, who became king under the title of John III (See JOHN III SOBIESKI). He was succeeded by Frederick Augustus I, elector of Saxony, who got entangled in the war between Russia and Charles XII and had as a rival in the kingdom Stanislas Leszczynski. Augustus III (1733-1763) followed, and by the end of his reign internal dissensions and other causes had brought the country into a state of helplessness. In 1772, under the last feeble king, Stanislas Augustus (1764-1795), the first actual partition of Poland took place. About one-third of her territories were seized by Prussia, Austria and Russia, Prussia receiving the Province of West Prussia, comprising an area of 13,415 square miles; Austria receiving Galicia and Lodomeria, 27,000 square miles, and Russia receiving part of Lithuania, 42,000 square miles. What remained to Poland was completely under Russian influence, despite the earnest struggles of the patriots under Kosciuszko. Another partition in 1793 gave Russia nearly 97,000 square miles and Prussia 22,500 square miles. Again the patriots rose, made Kosciuszko dictator and seemed in a fair way to succeed. Late in 1794, however, Kosciuszko was defeated at Maciejowice by the Russians and Prussians, and in the following year a third partition took place, by which Russia gained 45,000 square miles, Prussia 21,000 square miles and Austria 18,000 square miles. The last Polish king became a pensioner of the Russian court.

The Poles welcomed Napoleon, thinking that he would restore their liberty, and they furnished him a large number of men; but he was able to

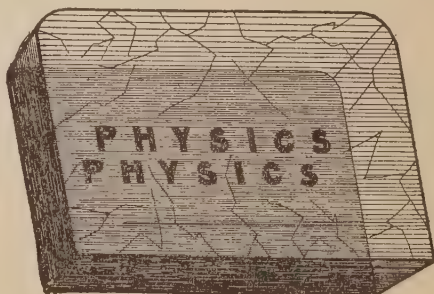
accomplish little in their behalf, and even the Duchy of Warsaw, which had been established under his suzerainty, lost its independent existence after the disastrous invasion of Russia in 1812. From 1815 to 1830 Russian Poland was a constitutional monarchy, with the emperor as king, but the Poles, seizing the occasion of the French Revolution, at the latter date rashly engaged in an insurrection, which only hastened their complete absorption in Russia. The name *kingdom of Poland* indeed remains, but all the independent institutions of the country have been swept away, and the whole country has been incorporated with Russia. The Polish language has been entirely superseded by Russian in all courts of law, educational establishments and public offices; and all official correspondence must be in Russian. The population of Russian Poland is approximately 12,000,000. Consult Morfil's *Poland*, in the *Story of the Nations Series*.

Polar Bear. See BEAR.

Polar Exploration. See NORTH POLAR EXPLORATION; SOUTH POLAR EXPLORATION.

Polariscope, an optical instrument for exhibiting the polarization of light or for examining transparent substances for the purpose of determining their polarizing power. The important portions of the instrument are the polarizing and analyzing plates, or prisms, and these are formed either of natural crystalline structures, such as Iceland spar and tourmaline, or of a series of reflecting surfaces artificially joined together. See POLARIZATION OF LIGHT.

Polarization of Light, the operation produced in a ray of light by the action of certain



DOUBLE REFRACTION

bodies, by which it is made to change its character. Since light is produced by vibrations running at right angles to the line in which the rays travel, if we could look at the end of a ray of light as we can at the end of a pencil, we should see waves running across it in every direction and

crossing each other in the center of the ray (See *LIGHT*, subhead *How Light Travels*). Because of this, only a part of the waves will pass through certain substances, and those through which it passes are modified in their nature. For instance, crystals of tourmaline obstruct some of these waves and polarize those passing through, while other substances, like Iceland spar, produce a double refraction, so that an object seen through them appears double, as shown in the figure. If two crystals of Iceland spar are fitted to the tube of a microscope so that one of them can be rotated, the axes of the crystals will be brought into different angles with each other, the light passing through them is polarized and the objects seen show rainbow tints. Such an instrument is called a *polariscope*.

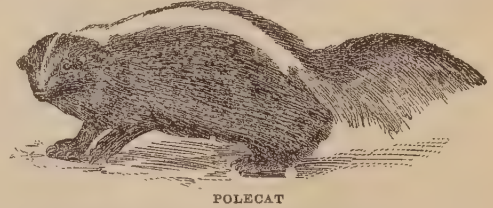
Some substances have the property of turning the polarized rays to the right, and others, to the left. Practical use is made of this peculiarity, in detecting adulteration in sugar and some other substances, since sugar and the substances used to adulterate it turn the rays in different directions.

Pole, the name given to either extremity of the axis round which the earth revolves. The northern one is called the *north pole*, and the southern, the *south pole*. Each of these poles is 90° distant from every part of the equator. In astronomy, the name is given to each of the two points in which the axis of the earth is supposed to meet the sphere of the heavens, forming the fixed point about which the stars appear to revolve. In a wider sense a pole is a point on the surface of any sphere, equally distant from every point of the circumference of a great circle of the sphere; or a point 90° distant from the plane of the great circle, in a line passing perpendicularly through the center called the axis. Thus, the zenith and the nadir are the *poles* of the horizon. So the *poles* of the ecliptic are two points of the sphere whose distance from the poles of the world is equal to the obliquity of the ecliptic, or they are 90° distant from every part of the ecliptic. *Pole*, in physics, is one of the points of a body at which its attractive or repulsive energy is concentrated, as the poles of a magnet, the north pole of a needle, the poles of a battery.

The *magnetic poles* of the earth are the points at which a magnetic needle varies 90° from a horizontal position, that is, stands vertical. It is not certain that this pole is positively stationary. The most recent observations concerning the north magnetic pole were made by Captain Amundsen in 1906. He placed it in the near

neighborhood of latitude 70° north, and longitude 100° west. See *DIPPING NEEDLE*.

Polecat, a name given to several species of the weasel family. The common polecat is found in most parts of Europe, except the extreme south. It is about seventeen inches long, with long, coarse brown fur, which grows blackish on the feet and tail. A superior kind of artists' brush is made from the hairs. The polecat



POLECAT

possesses an odor something like that of the American skunk, and hence in the United States the skunk is often called the polecat. It is very destructive to poultry, rabbits, rats and mice, and also feeds on snakes, frogs, fish and eggs. The *ferret* is a domesticated albino variety of the polecat.

Pole Star or **North Star**, the star of the constellation Ursa Minor, situated about 1° 20' from the north celestial pole, round which it thus describes a small circle. It is of the second magnitude and is of great use to navigators in the northern hemisphere. Two stars, called the pointers, in the constellation Ursa Major (the Great Bear or Big Dipper) always point in the direction of the pole star, which is thus readily located. See *BEAR*, *GREAT*.

Pole Vault. See *ATHLETICS*.

Police, *po lees'*, the system instituted by a community to maintain public order, liberty and the security of life and property. The primary object of the police system is the prevention of crime and the pursuit of offenders; but it also serves other purposes, such as the suppression of mendicancy, the preservation of order, the removal of obstructions and nuisances and the enforcing of those local and general laws which relate to the public health, order, safety and comfort. The term is also applied to the body of men by which the laws and regulations are enforced.

A police force may be either open or secret. An *open* police includes officers dressed in their accustomed uniform, and known to everybody; a *secret* police is composed of officers whom it may be difficult or impossible to distinguish from ordinary citizens. This latter class of

officer is termed, in America and Great Britain, a *detective*.

In the United States each city has a separate police administration. The organization of a uniformed municipal police is comparatively recent; in New York it was not substituted for the inefficient night watch until 1845. The present police organization of that city may be taken as representative of the American system generally. The city, with an area of 309 square miles and a population of about 4,000,000, is divided into inspection districts, which are subdivided into precincts. At the head of the force is a superintendent, or commissioner, under whom there are district inspectors, a captain over each precinct, sergeants, roundsmen (visiting officers), patrolmen (the body of the force) and doormen at the stations. There are also twenty-three police surgeons. The general administration of the force is vested in the commissioner of police, who makes appointments from a list furnished by the civil service commission, transfers, hears charges against members of the force and makes rules and regulations for the discipline of the department. The captains report every morning to the central office. The roundsmen must see that the patrolmen are properly performing their duty, and the sergeants again are responsible for both roundsmen and patrolmen. Besides the general force, there are several "squads" organized for special duties. These include the "sanitary police company," whose members inspect buildings, premises and employments which are supposed to be dangerous to life or detrimental to health, report nuisances and seize food unfit for consumption; officers of this company also act as school-board officers, and others, qualified as engineers, inspect steamboats and stationary steam boilers used for motive power in the city. The detective force is also a separate "squad," as are also the mounted squad for duty near Central Park, the mounted patrol for rural precincts, the harbor police, the "ordinance squad" (for enforcing city ordinances), the Broadway squad (for aiding pedestrians in crossing during the day), special service squads and others. In 1913 the police force of New York numbered more than 10,500 men; the average annual cost of the force is about \$10,000,000.

Polillo, *po le'lyo*, one of the Philippine Islands. See PHILIPPINE ISLANDS.

Political Econ'omy or **E'conom'ics**, the science which has as its aim the investigation

of the production, distribution, exchange and consumption of wealth, that is, of all articles or products possessing an exchange value. From earliest times there have been controversies over the exact scope and definition of this science. Owing to the conditions under which the production and regulation of wealth must be carried on, the science which investigates this subject is of necessity closely related to all other fields of scientific inquiry and is with difficulty separated from the consideration of physical, intellectual and moral conditions and problems. This fact has led some scholars to declare that political economy has no place as an independent science. For the reason, however, that it involves the systematic statement of a particular class of facts and the drawing of conclusions from them, it is now generally agreed that it may fairly lay claim to consideration as a special science.

SCOPE. Controversies as to the exact nature, and, therefore, as to the definition, of political economy as a science have centered about two important questions, namely, its content or scope, and the method to be employed in its study. As to its scope, there are four clearly defined divisions of the science, considered in its broadest sense: (1) The accumulation, definition, description and classification of economic facts. (2) The investigation and analysis of these facts, in order to determine relations of cause and effect between them, leading to the formulation of so-called economic laws. (3) The determination of the proper aims and ideals of economic progress, judging from the laws which have been evolved. This phase of the subject is evidently closely allied to ethics, or the question of right and wrong. (4) The consideration of the methods or means of attaining these ideals. This involves the investigation of political facts and policies with relation to economic questions, and it may therefore be called *practical*, or *applied*, *economics*. As the subject is viewed by modern students, it includes all of these phases; but in the past, different schools of economists have arisen and flourished, laying emphasis upon each one of these four branches, and it is only within a half-century that the two last-named branches of the subject have been generally admitted as a part of the field of political economy.

METHOD OF INVESTIGATION. An equally bitter contest has raged over the question of method, and advocates of the deductive method, of the inductive method and of special combina-

tions of the two methods have been numerous. Those who cling to the deductive method have adopted certain postulates, from which they reason in a perfectly abstract manner to certain conclusions, which they then verify by observation of economic facts. The postulates which they accept were, however, originally the result of inductive reasoning, such as the following: That the average man desires more wealth and wishes to gain it by the least possible exertion. From such principles as this, they build up a system of reasoning, which, if their premises were correct, would apply to a community in which competition was perfectly free. The chief defect of this system lies in its disregard of historical development and of existing conditions, which have so modified the operation of the laws which they have deduced, that these laws are of little practical use in explaining economic facts. Another class of economists has held that the only basis for the formulation of economic laws was in the observation of an infinite number of concrete facts, under such conditions that the exact cause and the exact relation in a certain place and time of a certain class of facts could be determined. In the examination of facts they adopted two means, one known as the *method of difference*, and the other, as the *method of agreement*. In using the former, sets of conditions are devised or created in which all circumstances are exactly the same, except those related to one factor; by comparing the operation of this factor in the two cases, its exact effect can be seen. In using the method of agreement, sets of conditions are created which are wholly different, with the exception of two factors whose relations are to be studied. The chief defect of the inductive method, whether by means of comparison of differences or of agreements, lies in the fact that it is almost impossible to control every condition in a complex society, and unless every condition is accounted for, the results of the experiment are nearly valueless. Among those who have used the inductive method solely is a class of scholars to whom historical facts seem so important as a basis for formulating general laws that they have declared that we do not possess sufficient historical information from which to generalize as to the action of economic forces. Therefore, they hold, much of economic science as expounded to-day is of no value.

It is evident from what has been said above that though each of these methods of reasoning

has its place in the science of political economy, neither is sufficient in itself to establish a logical and complete system of laws. Modern economists therefore have resorted almost invariably to a combination of the two methods. Their systems are based upon deduction, to the extent that they take from other branches of science established principles. For instance, from chemistry they accept the truth that after a given point of cultivation has been reached, equal applications of labor to the soil do not produce proportionate returns. From physiology they take the principle that man's physical hunger must be satisfied; from psychology, that he will attempt to satisfy this hunger with the least possible exertion. These principles they apply to the explanation of economic facts, and by comparison, in accordance with the inductive method, they disclose certain effects under certain conditions; these effects, after being studied under sufficiently various circumstances, are formulated into laws. Obviously, in the use of such a method, the study of economic facts from the historical standpoint is a necessity, but it is not more important than the investigation of present conditions. In both of these fields the statistical method must be constantly used, to bring the facts of each class together.

CONTENT, OR ELEMENTS. The science of political economy in its broadest sense includes, as the definition indicates, four general heads: (1) The investigation of *production*, including all the factors of production, namely, *land* (all natural agents), *labor* and *capital*; the law of fertility of land (the law of diminishing returns); the laws of the growth of population; the development of capital; the organization of industry, including transportation. (2) The pure theory of *value*, that is, of value as it would arise in a market where competition was absolutely free. This includes discussion of the relation of value and utility; of supply and demand; of cost of production; of the law of rent and the relation of rent to value; of the distribution of the product among the factors of production—land, labor and capital. (3) The *application* of this theory of value to the actual conditions of trade, including consideration of the medium of exchange; the principles governing the purchasing power of money, as well as the influence of credit transactions; the relation of legal and social customs, monopolies, trade unions, co-operation, socialism, upon the production and distribution of wealth. (4) The economic func-

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tions and influences of government, including the question of taxation, direct and indirect, and government interference in economic affairs, and involving such questions as tariff and subsidy.

HISTORY. Political economy, as a separate science, is scarcely a century old. However, every people within historic times has been compelled to consider economic problems, and to a greater or less extent has formulated economic theories. Among the Greeks, Plato, Xenophon and Aristotle stand out as the principal contributors to the subject, but their consideration was confined almost wholly to the relation of the State to economic forces. The Romans made little advance, but accepted almost intact the Greek theory, with only such modifications as the different aims of the Roman State made necessary. From the fall of Rome to the latter part of the Middle Ages, there was little discussion of economic questions, but in the thirteenth century the development of the burgher class and the growth in independence of the towns led to an increasing extent and complexity of industry and commerce, which required the formulation of fairly definite policies. From time to time these were expressed in the writings of the period, among the questions considered being the nature and functions of money, institutions of credit and the legitimacy of interest. In the sixteenth century, chiefly through the work of French and English writers, there was developed the famous *mercantile system* of political economy, which was directed toward the development not only of a strong central political State, but of an economic State as well, and thus taught that commerce and industry should be closely regulated, in order that the industry of every country should contribute benefits to that country alone. A little later there was a general reaction toward free trade, which found its expression in a number of different theories of trade, among which was that of the physiocrats of France, whose motto was to allow each man to labor for his own interests, in his own way, without the slightest government restriction. This theory was greatly developed and popularized by Adam Smith, and from his epoch-making *Wealth of Nations* dates practically the whole modern science of political economy. After the time of Smith new elements of the science were introduced by Malthus, who declared that population tended always to outrun subsistence; by Ricardo, who enunciated the modern theory of rent, and by

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a host of other men, among them, Torrens, James Mill, McCulloch, Senior, John Stuart Mill, Cairnes and Marshall. Of the most recent school, Jevons, an advocate of the statistical method; Karl Marx, the socialist; Roscher, a German economist who urged the historical method, have all made important contributions; while many contemporary American scholars have had much influence in defining the field of political economy and in establishing certain important principles. Among these men were H. C. Carey, who is best known, perhaps, for his earnest defense of the policy of protection in a period when the general tendency was toward free trade; Francis A. Walker; Henry George, who attempted to reorganize political economy with Ricardo's law of rent as its underlying principle, and Richard T. Ely, who has devoted himself particularly to the consideration of the economic functions of government. See **VALUE; CAPITAL; INTEREST; RENT; WAGES**, and allied topics.

Political Offenses, those offenses considered injurious to the safety of the state, or such crimes as form a violation of the allegiance due by a subject to the recognized supreme authority of his country. The most serious political offense is termed *treason*, and those of a lighter nature, which do not aim at open violence against the laws, but which excite a discontented spirit which would likely produce violence, are termed *sedition*. Extradition treaties usually do not compel the giving up of political offenders.

Political Parties in the United States. During the colonial period of American history, political parties as such did not exist, since the issues which divided the people centered almost wholly in the relations of the colonial governments with the mother country, and upon these there was at first little difference of opinion among the colonists themselves. After 1760, with the development of a more rigid colonial policy on the part of England, two factions arose in America, one favoring the steps taken by the home government to compel obedience to its decrees, the other opposing this obedience and favoring a constantly increasing degree of self-government. With the approach of open conflict, the American, or patriot, party began to call themselves *Colonial Whigs*, because of the gratitude which they felt for the work of the English Whigs in their behalf. Accordingly, those who opposed the demands of the patriots were known as *Tories*. In the course of the

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Revolution, through active measures taken by the patriots, the Tories began to leave the country in large numbers, and at its close the people were almost united in their loyalty to the new American nation.

Meanwhile, the Articles of Confederation had been framed and the new government had been organized; but from the beginning a difference of opinion was manifest regarding the constitution of this new government. One party, consisting largely of those who lived in rural districts, together with the debtor and professional classes, favored a loose confederacy, in which the separate states retained most of the powers of sovereignty, delegating to the central government only such rights and powers as concerned all of the states. Another party, which constantly increased in size after the adoption of the Articles, owing to the manifest weakness and inefficiency of the government, demanded the establishment in the central government of all the essential powers of sovereignty, making it a government having jurisdiction over the people of the country rather than over the states, and leaving to the states themselves only the powers of local government. The latter party gained such strength that a convention was finally called to revise the Articles of Confederation, and in this convention the two parties fought out their differences and by a system of compromises produced a new Constitution. In most respects, however, the strong central government party, known in the convention as *Nationalists* and after its conclusion as *Federalists*, gained their points, and the Constitution, as it went before the people for ratification, though satisfactory to neither party, vested far more powers in the central government than did the old Articles of Confederation. After bitter contest throughout the country the Constitution was adopted by the requisite number of states and went into operation, and the Federalist party, in the persons of Washington, Hamilton, Jay, John Adams and others, was first raised to power.

The first real party organization developed soon after, in opposition to the financial measures introduced by Alexander Hamilton, which included payment of the debt of the old Confederation, payment of the debts owing by the states as a result of the Revolution, and establishment of a national bank. All the measures passed, and for the next twelve years the Federalist party maintained control of the government. During that time, however, owing to

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the well-known spirit and intentions of some of Washington's advisers, and in spite of his own declarations, there was a growing feeling that the Federalists aimed to make the government eventually monarchical in form. This, coupled with the sympathy among a large number of people for the advanced democratic ideas finding expression in the French Revolution, together with certain acts passed under the Federalist administration disclosing a distrust of the people, led to the overthrow of the party in 1801 and the election of an *Anti-Federalist* president, Thomas Jefferson.

Thereafter, for twenty-five years, the Anti-Federalist party remained in power, changing its name under various circumstances, first to *Republican*, then to *Democratic-Republican* and finally, to *Democratic*. During this period, however, a change occurred in the general policy of the Anti-Federalist party. Whereas it had come into power as the party of the strict construction of the Constitution, circumstances compelled it to disregard its old principles at times and to interpret the Constitution more liberally than the Federalists ever had done, as in the expansion of territory by the Louisiana Purchase and in the Embargo and Non-Inter-course acts. The War of 1812, which was brought about through diplomatic blunders and general lack of broad foreign policy, might have been turned to the advantage of the Federalists had they not lacked efficient leaders, but it proved to be their downfall. The Hartford Convention, which met in 1814 and was composed of New England Federalists, went so far in condemning the policy of the government as to lay its members open to the charge of disloyalty, and the little respect which had been retained for the Federalists rapidly disappeared.

In 1817 the Federalists nominated Rufus King of New York for president, and the Republicans nominated James Monroe. The election resulted in 183 electoral votes for Monroe and 34 for King. Though Monroe's administration is known as the "Era of Good Feeling," in reality party dissension continued throughout this period and in fact became so bitter over the questions of tariff, internal improvements and the interpretation of the Constitution, that a large faction of the Republican party broke away from its allegiance and formed a new party, known as the National Republican, led by John Quincy Adams and Henry Clay. Many of the old Federalists supported the new party, and its candidate, Adams, was elected in 1824.

over Andrew Jackson, the Republican candidate. However, the growing demand for a "people's president," which was expressed in the popular candidacy of Jackson, grew to such proportions that the National Republicans were swept out of office, and Jackson was chosen president. The Republicans, now known as Democrats, had already adopted, in part, at least, many of the principles of the National Republicans, and internal improvement and protection remained the policy of the government.

In 1832, for the first time, the parties nominated their candidates for president by national conventions, all of which were held at Baltimore. In this election the *Anti-Masonic* party, opposed to the influence of secret societies in elections, also appeared, but it polled only seven electoral votes. During Jackson's second administration (1833-1837), the hold of the Democrats upon the government was decidedly weakened through Jackson's open opposition to the national bank, which had become an important part of the fiscal system of the country. However, in 1836, the Democratic candidate, Martin Van Buren of New York, was chosen president. Meantime, the old National Republicans had changed the name of their party to the *Whig* party, and, joined by the Anti-Masons, they supported William H. Harrison, of Ohio, for president. Throughout this administration the influence of the Democrats was constantly weakened, Congress was almost evenly divided between Whigs and Democrats, and the administration was constantly harassed by its inability to secure the passage of its measures. Meantime, the anti-slavery forces had united and formed the *Liberty* party, and in 1840 they chose James G. Birney as their candidate. The Whigs, including many Southern Democrats who had become alienated from their party by Jackson's and Van Buren's attitude toward slavery, protection and other issues, united upon William Henry Harrison; the Democrats nominated Van Buren. Harrison was victorious after a memorable campaign, but he died shortly after and was succeeded by the vice-president, John Tyler, a former Southern Democrat, opposed, on general principles, to the party of which he was now the representative.

In 1843 Clay was the candidate of the Whigs, Birney was again chosen to represent the Liberty party, and James K. Polk was the candidate of the Democratic party. Polk was elected by a small popular and electoral majority, the

paramount issue being the annexation of Texas. This was accomplished only after the Mexican War, which tended still further to divide both parties upon sectional lines. In 1848 Zachary Taylor, the Whig candidate, was chosen over Lewis Cass, the Democratic nominee, and Martin Van Buren, the nominee of the *Free-Soilers*, who now had absorbed the old Liberty party and many Northern Democrats and Whigs, who found the wavering slavery policy of the two old parties objectionable. During the succeeding administration the slavery question constantly recurred in various forms, relating to the admission of new states, the power of Congress to restrict slavery in the territories, and the obligation of free states to return fugitive slaves to their owners. The most important event of the period was doubtless the passage of the Compromise of 1850 and the Fugitive Slave Law, which seemed for a time to settle the slavery question. President Taylor died July 9, 1850, and was succeeded by Millard Fillmore, an Anti-Slavery Whig. In 1852 the Democrats nominated Franklin Pierce of New Hampshire, endorsed the compromise measures of 1850 and urged the suppression of agitation regarding slavery. The Whigs nominated Winfield Scott, who also endorsed the slavery compromises, but in cautious terms. The Free-Soilers denounced all compromise with slavery and nominated John P. Hale of New Hampshire. Twenty-three out of twenty-seven states chose Democratic electors.

During Pierce's administration the slavery question again came to the front, in the discussion of the Kansas-Nebraska Bill, which divided both parties; the Southern Democrats and Southern Whigs united in favor of the bill, which practically took from Congress the power to regulate slavery in the territories, while the Northern Democrats were evenly divided concerning it, and the Northern Whigs and Free-Soilers were united against it. The Democratic party re-united after this contest, but the Whigs were permanently divided, and soon after, the name disappeared from politics. Meantime, a new party had arisen, officially called the *American* party, but popularly known as the "Know-Nothings." Its candidate in 1856 was Millard Fillmore. The Democrats nominated James Buchanan. A second new party, consisting chiefly of the opponents of the Kansas-Nebraska Bill, but including a number of the different factions favoring the loose construction of the Constitution and the principle that the

Political Parties in the United States

Federal government can control slavery in the territories, appeared. It was known as the *Republican* party, and its candidate was John C. Fremont. Before this election the Democrats, through President Pierce, had taken a firm position against the power of the Federal government to control slavery in the territories. By means of a practically solid Southern vote against a divided Northern vote, Buchanan was elected.

The slavery question moved rapidly forward to a crisis during Buchanan's administration. The Dred Scott Decision, practically opening all United States territory to slavery, aroused the North to a realization that the slave power must immediately be arrested, if it were not to gain complete control of the government. Consequently, in 1860 the Republican candidate, Abraham Lincoln, of Illinois, received the support of many Northern Democrats and of practically all the opponents of slavery. The Democrats came to an open division at this time, one wing, consisting of the radical Southern element, demanding a radical declaration in favor of slavery, another wing favoring the regulation of slavery by the people of the territories themselves and, above all, the maintenance of the Union. The Southerners nominated John C. Breckenridge; the Northerners, Stephen A. Douglas. The American, or Know-Nothing, party, changing its title to the *Constitutional Union* party, nominated John Bell, of Tennessee, upon a platform which completely evaded the slavery issue. The election resulted in favor of the Republicans, and immediately several of the Southern states seceded.

The Civil War was the outcome, and for four years the government, though nominally in the hands of the Republicans, was in reality supported by a party calling itself the *Union* party, consisting entirely of Northerners, both so-called "War Democrats" and Republicans. However, by 1864 a sufficient number of the Democratic supporters of the administration had become estranged to make a serious opposition in the national election, upon the assertion that the war was a failure. Its candidate was George B. McClellan, of New Jersey, a popular general. Lincoln was again nominated as the Republican candidate, and a convention of radical Republicans, who demanded more harsh treatment toward the rebellion, nominated John C. Fremont, of California. Lincoln, however, was reelected. On the death of President Lincoln, April 14, 1865, just as the

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war was coming to a close, Andrew Johnson, of Tennessee, a War Democrat, became president, and during the next four years all parties suffered the severest strain. Johnson immediately disclosed his disapproval of the reconstruction policy of Congress and, as a result of his fierce and tactless opposition, he was impeached, being saved from conviction by only one vote. However, the Democrats, who had approved his course, refused to support him in 1868, nominating Horatio Seymour, of New York, against the popular Republican candidate, General U. S. Grant.

Grant gained an overwhelming victory and furthered the Republican policy as outlined by Congress. During his two administrations, however, the opposition to the radical reconstruction policy gained strength and found expression in the *Liberal Republican* party, which, at its convention in May, 1872, nominated Horace Greeley, of New York, a former Republican. Grant was renominated by the Republican party, and, though the majority of the Democrats endorsed the Liberal Republican nomination, a few refused to follow and nominated Charles O'Connor. For the first time, also, the temperance party presented a candidate for president. Before the electoral votes were counted, Greeley was dead, and Grant received an overwhelming majority, only scattering votes being cast for the other candidates. During the second administration of President Grant, charges of corruption, involving many high officials, led to a serious rupture in the Republican ranks, and in 1876 the Democratic candidate, Samuel J. Tilden, gained a majority of the popular vote, though his Republican opponent, R. B. Hayes, was chosen by an electoral commission, to whom were referred the returns from a number of disputed states. At the same time Peter Cooper was candidate for president on the *Greenback*, or *National*, party ticket, put forward by a coalition of elements who favored an unlimited issue of paper currency, and Greene C. Smith was the *Prohibition* candidate.

Reconstruction was completed under Hayes, and the corruption which had been disclosed under his predecessor was so vigorously dealt with that the Republicans made decided gains in popular esteem. Their candidate, James A. Garfield, was elected in 1880 by a small plurality over Hancock, the Democratic nominee, and James B. Weaver, the Greenback candidate. Garfield was assassinated early in the following

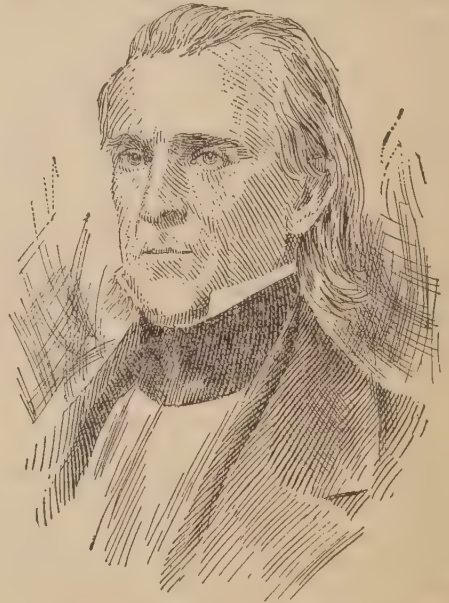
year and was succeeded by Chester A. Arthur. During his administration the tariff controversy, which had been constantly assuming greater importance since the Civil War, became the paramount issue, and the Democratic candidate, Grover Cleveland, was elected in 1884, over James G. Blaine, Republican; John P. Saint John, Prohibitionist, and Benjamin F. Butler, *Laborite*, the candidate of the old Greenback faction and of organized labor. Another influence which was important in this campaign was the demand for civil service reform. The Houses of Congress being controlled by opposite parties during this administration, little was accomplished by the party in power along the lines indicated by the campaign, and in 1888 the Democrats were turned out, Benjamin Harrison, the Republican candidate, being elected over Cleveland, Democrat; Fiske, Prohibitionist, and Streeter, the candidate of union labor. The McKinley tariff, which was passed in 1890, and the Sherman silver law of the same year, proved unpopular, and as a result of a wide-spread educational campaign on the part of the Democrats, Cleveland was again elected president in 1892. In this year appeared for the first time the *People's* party, which was a coalition of all the former labor and greenback factions; its candidate received more than a million popular votes and the electoral votes of six states. The *Socialists* also nominated a candidate, Simon Wing; the Prohibitionists nominated John Bidwell, and the Republicans, Benjamin Harrison.

In 1896 the so-called radicals gained control of the Democratic organization, repudiated the policy of the administration regarding the fiscal and monetary management of the government, and declared for the free coinage of silver at the ratio of sixteen to one. They nominated William J. Bryan, of Nebraska, for president. The Republicans nominated William McKinley, of Ohio, author of the McKinley Bill, on a platform which declared for higher tariff and for the gold standard of coinage. The *People's* party endorsed the Democratic nomination. The Prohibitionists in this campaign were divided, one faction standing for the single principle of prohibition, another declaring for free silver, woman suffrage and other principles of the *People's* party, then known as *Populists*. A number of Democrats, dissatisfied with the action of the Democratic convention, met at Indianapolis and nominated so-called *National Democratic* candidates, John M. Palmer, of

Illinois, for president, and Simon B. Buckner, of Kentucky, for vice-president. McKinley was elected, and the success of his administration led to his reelection in 1900. McKinley was assassinated in 1901, and Theodore Roosevelt, who had been elected vice-president, became president. Roosevelt was reelected president in 1904, and throughout his two terms was remarkably successful in securing progressive legislation.

The contest in 1908 was between William Howard Taft, of Ohio, and Bryan, Taft being elected. Four years later, when Taft was re-nominated by the Republicans, the progressive Republicans formed a new National Progressive Party, and nominated Roosevelt for president and Governor Johnson of California for vice-president. The Democrats nominated Woodrow Wilson and Governor Marshall of Indiana who were elected by a large plurality. See UNITED STATES, sub-head HISTORY.

Polk, *poke*, JAMES KNOX (1795-1849), an American statesman, eleventh president of the



JAMES KNOX POLK

United States, born in Mecklenburg County, N. C. He graduated at the state university, studied law, and was admitted to the bar in 1820. He was soon elected to the legislature and in 1825 entered Congress as a Democrat. There he served as speaker during two terms, winning distinction by his industry and ability. He

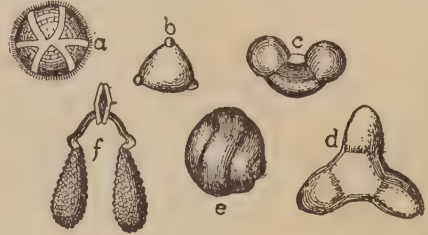
was an ardent supporter of President Jackson and of Van Buren. He remained in Congress until 1839, when he was elected governor of Tennessee, but he was later twice defeated.

In 1844, however, Polk secured the Democratic nomination for the presidency, as a compromise candidate, and after a memorable campaign against the Whig nominee, Henry Clay, he was elected, through his earnest advocacy of the party platform, which demanded the "reoccupation of Oregon and the reannexation of Texas." He was carried into office partly by the famous cry of "54, 40 or fight," which referred to the popular demand for the possession of all of Oregon as far as 54° 40' north latitude; but the administration was wisely content with a compromise solution of the boundary question and thus avoided a war with Great Britain. Meantime, the boundary of Texas had caused a serious dispute with Mexico, which precipitated a war in 1846. It was conducted with vigor by the administration and resulted in the acquisition of large territory (See MEXICAN WAR). During Polk's administration the low Walker tariff was also passed, and the independent treasury system, advocated by Van Buren, was established. A debate over the Wilmot Proviso, which also occurred during his term, marked an important step in the slavery controversy.

Polk, LEONIDAS (1806-1864), an American soldier, born at Raleigh, N. C., and educated at the state university and at West Point. He resigned from the army, entered the Episcopal ministry and in 1841 became the first Protestant Episcopal bishop of Louisiana. In this position he exerted his influence for the establishment of facilities for higher education in the South, which resulted in the establishment of Suwanee University in 1858. At the outbreak of the Civil War, he was appointed, on account of his thorough knowledge of the Southern states, major general in the Confederate service, with command of the defense of Tennessee and Missouri. He fought at Belmont, Shiloh, Perryville, Murfreesboro and Chickamauga, having been meantime commissioned lieutenant general. As a result of charges by General Bragg, he was temporarily suspended, but was reinstated, though he declined again to enter the active service. He was killed at Marietta, during Sherman's campaign toward Atlanta.

Pollen, the cells formed in the anthers of flowers, which, when carried to the stigma of another blossom of the same species, cause the

ovules to develop into seeds. Pollen grains are minute, yellowish bodies, which vary greatly in size, shape and markings, according to the methods by which they are carried from stamen to pistil. Some are so exceedingly minute that they are carried easily by the wind, and others are covered with a sticky substance that makes them cling to anything touching them. Some are spherical; others elongated or angular. They may be smooth or they may be covered with knobs or spines; but whatever the shape or appearance, they are always the same in



POLLEN

a, gourd; b, enchanter's nightshade; c, pine; d, evening primrose; e, musk plant; f, milkweed.

the same plant. When a pollen grain has been carried to the stigma of a plant, it develops delicate tubes, which find their way down through the style to one of the ovules. Where the style is very long, several days may be required for the tubes to penetrate to the ovule, but as soon as it has been reached, the ovule begins to divide and grows rapidly into an embryo, around which form walls that ripen into a mature seed. Only one pollen grain is necessary for the fertilizing of any ovule, but so great are the chances for destruction that every plant produces many more pollen grains than it is possible should live.

Poll, *pole*, **Tax**, a tax levied "by the head," that is, at a certain amount for each person, citizen or voter within the state. In most states of the Union, it is \$1, but it varies from \$0.50 to \$3.00, and in some states it is prohibited by constitution or by law.

Po'lo, a ball game, played on the same general principles as hockey, but in which the contestants are mounted on ponies. They drive the ball forward and backward by means of a mallet, or stick with a cigar-shaped head eight or nine inches long and two inches thick and with a crook at the end. These mallets are about four feet four inches long. Since the ponies are ridden at full speed and since there are eight men trying to drive the ball between the goals at opposite ends of the field, the game

may be a very rough one. Yet it is exceedingly popular, both in England and America, especially among the wealthy. In fact, it cannot be a poor man's game, on account of the expense of keeping the ponies. Good polo ponies are very expensive, for they must be quick, strong, active and thoroughly trained; in fact, a good horse takes as much interest in the game as his master and follows the ball with almost as great skill. Sometimes the ponies are seriously injured, and no one animal is expected to last out a game; in fact, the riders change their horses at the end of each period. See WATER POLO.

Polo, MARCO (about 1250-1324), a Venetian traveler, born of noble family. Shortly before his birth, his father, Niccolo, and his uncle, Maffeo, set out on a mercantile expedition and ultimately arrived in China, where they were favorably received by Kublai Khan, the grand khan of the Mongols. In 1266 the khan sent the brothers on a mission to the pope, and they arrived in Venice in 1269. Two years later they again set out for the East, this time accompanied by the young Marco. After reaching the court of Kublai, Marco rapidly learned the language and customs of the Mongols and became a favorite with the khan, who employed him on various missions to the neighboring princes. Soon afterward he was made governor of a province in Eastern China, an appointment he held for three years. In 1292 the three Polos accompanied an escort of a Mongolian princess to Persia. Learning of Kublai's death, they resolved to return home, and they reached Venice in 1295. In the following year Marco Polo took part in a naval battle against Genoa, in which he was taken prisoner. During his captivity he dictated to a fellow prisoner an account of all his travels, which was finished in 1298. After his liberation he returned to Venice, where he died. *The Book of Marco Polo* created an immense sensation among the scholars of the time and was regarded by many as pure fiction. It made known to Europeans the existence of many nations of which they were formerly totally ignorant and created a passion for voyages of discovery.

Polybius (about 205-120 B. C.), a Greek historian, born at Megalopolis, in Arcadia. Educated for arms and political life, he entered, at the age of twenty-four years, into the military and political service of the Achaean League. After the subjugation of Perseus, king of Macedonia, by the Romans, Polybius found himself

among the one thousand Achaeans summoned to Rome to explain why the League had not aided the Roman army in Macedonia. While in Italy he formed an intimate friendship with Scipio Aemilianus, and he accompanied him to Africa, where he witnessed the destruction of Carthage. He returned to Greece in 146, just after the fall of Corinth, and exerted himself successfully toward obtaining moderate terms from the Romans for his countrymen, who had again been defeated in the struggle with Rome. His principal work is his history of Rome.

Polycarp, a celebrated early Christian martyr, born, according to his testimony, about 69 A. D., of Christian parents. He was taught by the Apostle John and was acquainted with many that had seen Jesus. Polycarp was bishop of Smyrna and late in life went to Rome, where he disputed with the bishop about the time for commemorating the Passion. This preaching won many from their heresies. He returned to Smyrna, where he was among those who suffered martyrdom. Being offered his life if he would revile Christ, he said, "Four-score and six years have I been His servant, and He hath done me no wrong. How then can I blaspheme my King who hath saved me?" The *Epistle to the Philippians* is the only one of Polycarp's writings that is extant. No other work of the time contains so many New Testament phrases.

Polycrates, *po lik'ra teez*, a tyrant of Samos, who flourished about 520 B. C. So remarkable were his successes that he was known as the "darling of the gods." According to legend, at one time he attempted to make an alliance with the Egyptian king, who warned him that to prevent envy on the part of the gods, he should sacrifice his most valued possession. Accordingly he threw into the sea a most valuable ring, which, on the following day, was found in the mouth of a fish which was served on his table. The king of Egypt, learning that the sacrifice of Polycrates was refused by the gods, declined the alliance, and a few days later Polycrates was put to death by a satrap of Persia.

Polygamy consists in a man's having more than one wife at the same time. In ancient times polygamy was practiced by all the Eastern nations and was sanctioned, or at least tolerated, by their religions. It was permitted to some extent among the Greeks, but later it entirely disappeared among them. The ancient Romans and Germanic races practiced it but rarely. The institution still exists among the Mohammedans

Polygon

and among the Mormons, but it is not tolerated by other civilized peoples or by any other modern religions. Perhaps the most common form of polygamy is *bigamy*, in which a man has two wives.

Polygon, a portion of a plane, completely enclosed by straight lines. Polygons are called triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons, nonagons, decagons, etc., according as they have three, four, five, six, seven, eight, nine, ten sides, etc. A polygon is said to be regular when it is equilateral and equiangular. It is convex when none of its sides, if extended, would cut any other of its sides. It is concave when one or more of its sides, if extended, would cut others of its sides. It is cross when its boundary line crosses itself. The area of a regular polygon is equal to the sum of its sides multiplied by one-half the perpendicular distance from the center to any side. See QUADRILATERAL.

Pol'yhym'nia or **Polymnia**, among the Greeks, the muse of the pantomime. She usually was represented in art as covered with a white mantle, without any attribute.

Polymerism, *po lim'ur iz'm*. Sometimes compounds belonging to the same family have molecules composed of the same elements, which are present in the same proportion, but as they do not contain the same actual numbers of various atoms, they differ in molecular weight. This phenomenon is called polymerism, and the substances are said to be polymers of one another. See ALLOTROPY.

Polynesia, *pol i ne'she a*, a general name, formerly given to a number of distinct archipelagoes of small islands scattered over the Pacific Ocean, the Philippines, New Guinea, Australia and New Zealand being excluded. The islands are distributed into numerous groups, with a general direction from northwest to southeast. The term Polynesia is now generally restricted to the groups most centrally situated in the Pacific, comprising those islands not included in Melanesia and Micronesia. The islands may be divided into two chief classes, volcanic and coral islands. Polynesia has a comparatively moderate temperature, and the climate is delightful and healthful. The predominating race, occupying the central and eastern portion of Polynesia, is of Malay origin, with oval faces, wide nostrils and large ears. The other leading race is of negroid or Papuan origin, with negro-like features and crisp, mop-like hair. Christianity has been introduced into a great many of

Polytheism

the islands, and a large number of them are under the control of one or other of the European powers.

Pol'yp, a name now generally given to those animals which are attached to some solid foundation and which usually live in large colonies, secreting a common stock of jelly-like, horny or limy formation, in the cavities of which they reside. See CORAL; COELENTERATA.

Polyphemus, *pol i fe'mus*, in Greek mythology, the most famous of the Cyclopes. He was a giant, with one eye in the middle of his forehead, and he lived with his brother Cyclopes on an island, where all day he fed his flock, retiring at night to a cave by himself. During their voyage from Troy to Greece, Ulysses and his companions were cast ashore on this island and took refuge in the cave of Polyphemus. When the giant returned and discovered them, he rolled a huge stone before the door so they could not escape, and at once devoured two of Ulysses's companions. In the morning before taking his departure he ate two more. As he rolled the stone before the door when he left the cave, Ulysses and his companions were obliged to remain shut up all day, but during this time they sharpened and hardened with fire a large stick, which they hid. After supper that night Ulysses contrived to make Polyphemus drunk, and while he was in a drunken slumber, Ulysses with his companions, heated in the fire the sharpened stake and plunged it into the eye of Polyphemus. The giant, maddened with pain, was unable to capture any of the strangers, and when in the morning he drove out his flock, Ulysses and his companions, by fastening themselves under the sheep, were carried out into freedom.

Polytechnic, *pol i tek'nik*, **Schools**. See TECHNICAL EDUCATION; MANUAL TRAINING.

Pol'ytheism, the belief in, and worship of, several gods; opposed to atheism and to monotheism, the belief in, and worship of, one god. It is still a matter of debate whether polytheism is a primary form of human belief or has grown out of an original belief in one god. It is argued, on the one hand, that the sense of personal dependence, the feeling that there was an undefined power, a mysterious *something* around and above him, did not primarily present itself to the mind of man except under a form of unity. His earliest religion would therefore be of a monotheistic character, not very firmly fixed in his mind, and liable, among races of rude faculties and little power of controlling their thought, to assume a polytheistic form, the idea of one

Supreme Being being readily hidden by the many visible operations of that being on earth. Those who affirm that polytheism was a primary form of religious belief argue that man, ignorant of the nature of his own life and of the nature, origin and properties of other objects, could at first only attribute vaguely to all visible things the same kind of conscious existence as that which belonged to himself. Thus, the sun, the moon and the stars would all be living beings; and their influence, from the absence of any idea of a natural order, would be seen in the events that took place in the world and in human life. As being beyond human control and as affecting the condition of men, they would be loved or feared; and with the growth of the idea that they might be persuaded to forgive or to do a kindness, the system of polytheism would be complete.

Pomegranate, *pum'gran ate*, the fruit of a shrub or small tree which grows from eight to twenty feet high and is supposed to have come originally from the north of Africa. The fruit resembles a large apple, but has a tough and leathery skin. It has many seeds, surrounded by a soft pulp, which is more or less acid and is important as an article of food. The Mexicans distill from its juice an acid liquid, which they call *aguardiente*. The pomegranate is extensively cultivated throughout southern Europe and in the West Indies and Guiana.

Pom'elo. See GRAPE FRUIT.

Pomerania, a province of Prussia, bounded by the Baltic Sea, Mecklenburg, Brandenburg and West Prussia. Its area is 11,629 square miles. The coast is low and sandy and is broken by many lagoons. The interior is flat and in parts marshy. The principal river is the Oder, and the chief islands along the coast are Rügen, Usedom and Wollin. Although the soil is in general sandy, there are some rich alluvial tracts, which produce cereals, potatoes, beets and tobacco. Cattle raising is an important industry, and fish are taken in great quantities along the coast. The manufactures, which are not of primary importance, include glass, sugar, tobacco, woolen goods and distilled liquors. A considerable general and transit trade is carried on, and this centers largely in Stettin, the capital of the province.

Pomerania appears to have been inhabited originally by Goths, Vandals and Slavs. The first mention of it in history is about the middle of the twelfth century. It long remained an independent duchy, but in 1637, on the extinc-

tion of the ducal family, it was in part annexed to Sweden. In 1720 Prussia gained possession of a large part of the province, and in 1815 the remainder was secured. It is divided for administrative purposes into three governments, Stettin, Stralsund and Königsberg. Population in 1910, 1,716,921.

Pomera'nian Dog. See SPITZ.

Pomona, among the Romans, the goddess of fruit, and the wife of Vertumnus. At Rome she was usually represented with a basket of fruit, or with fruit in her bosom.

Pomona, CAL., a city in Los Angeles co., 33 mi. e. of Los Angeles, on the Atchison, Topeka & Santa Fé and the Southern Pacific railroads. It is a beautiful place in the San Gabriel valley and has become a popular health resort. The cultivation of oranges, lemons, citrons, figs, olives and almonds is extensively carried on. There are manufactories of wine, a canning factory, a planing mill and other establishments. Pomona College is at Claremont, near the city. The municipality has a public library and Ganesha Park, which commands a magnificent view of the surrounding country. It was settled in 1875 and was incorporated in 1887. Population in 1910, 10,207.

Pom'pano, a fine food fish, bluish and silvery in color, that lives permanently about the Florida keys and comes north along the Atlantic coast to spawn in the spring. It is about eighteen inches long and is captured in seines, and otherwise. There are a number of other species, elsewhere known as the pompano, among which is the highly prized *harvest fish*, that is found in the waters off southern California.

Pompeii, *pom pa'ye*, an ancient city of Italy, in Campania, near the Bay of Naples, about 12 mi. s. e. of Naples and at the base of Mount Vesuvius, on its southern side. Before the close of the Republic and under the early emperors, Pompeii became a favorite retreat of wealthy Romans. In 63 A. D. a fearful earthquake occurred, which destroyed a great part of the town. The work of rebuilding was soon begun, and the new town had a population of some thirty thousand, when, in 79, occurred the terrible eruption of Vesuvius, which buried the city to a depth of almost twenty feet under a mass of ashes, red-hot pumice stone and cinders.

Pompeii was completely forgotten during the Middle Ages, and it was not until 1748, when a peasant, in sinking a well, discovered a painted chamber, with statues and other objects of antiquity, that anything like a real interest in the

Pompey

locality was excited. Extensive excavations were now carried on, and in 1755 the amphitheater, theater and other parts were cleared out. Under the Bourbons the excavations were carried out on a very unsatisfactory plan. Statues and articles of value alone were extricated, while the buildings were suffered to fall into decay or were covered up again. To the short reign of Murat (1808-1815) we are indebted for the excavation of the Forum, the town walls, the Street of Tombs and many private houses. Latterly the government of Victor Emmanuel assigned \$12,500 annually for the prosecution of the excavations, and a regular plan has been adopted, according to which the ruins are systematically explored and carefully preserved.

The town is built in the form of an irregular oval, extending east and west. The circumference of the walls is about two miles, and there are eight gates. The streets are straight and narrow and paved with large blocks of lava. The houses are slightly constructed of concrete or occasionally of bricks. Numerous staircases prove that the houses were of two or three stories. The ground floor of the larger houses was generally occupied by shops. Most of these houses were entered from the street by a narrow passage leading to an interior hall, which provided the surrounding chambers with light and was the center of communication. The other portion of the house comprised the private rooms of the family. All the apartments were small. The chief public buildings are the so-called Temple of Jupiter, the Temple of Venus, the Basilica, the Temple of Mercury, the Gladiators' Barracks and two theaters. There are several interesting private buildings, including the villa of Diomedes, the house of Sallust and the house of Marcus Lucretius. The Museum of Naples owes many of its most interesting features to the ornaments, statues and other movable works of art found in the public and private edifices above mentioned.

Pom'pey, in full, Gnaeus Pompeius Magnus (106-48 B. C.), a distinguished Roman general. In the struggle between Marius and Sulla, Pompey raised three legions to aid the latter and regained all the territories of Africa which had forsaken the interest of Sulla. On his return to Rome, Sulla greeted him with the surname of *Magnus* (Great), and reluctantly consented to the triumph which Pompey demanded. After the death of Sulla, Pompey put an end to the war which the revolt of Sertorius in Spain had occasioned, and completed the subjugation of the forces of Spartacus (See SPARTACUS). In 70

Ponce de Leon

B. C., although not of legal age and without official experience, he was elected consul, with Crassus. In 67 B. C. he cleared the Mediterranean of pirates and destroyed their strongholds on the coast of Cilicia. In 65 he was placed in command of the army sent against Mithridates. He conquered Mithridates, Tigranes and Antiochus, and at the same time he subdued the Jews and took Jerusalem by storm. He returned to Italy in 62 and disbanded his army, but did not enter Rome until the following year, when he was again honored with a triumph.

Pompey, in order to strengthen his position, united his interest with that of Caesar and Crassus, and thus was formed the First Triumvirate. This agreement was concluded by the marriage of Pompey with Caesar's daughter Julia; but the powerful confederacy was soon broken. During Caesar's absence in Gaul, Pompey ingratiated himself with the Senate, was appointed sole consul and had the most important state offices filled with Caesar's enemies. Caesar was proclaimed an enemy to the state, and his rival was appointed general of the army of the Republic. Caesar crossed the Rubicon in 49 B. C. (See CAESAR) and in sixty days he was master of Italy without striking a blow. Pompey crossed over to Greece, and in that country, on the plains of Pharsalia, occurred the decisive battle which made Caesar master of the Roman world. Pompey fled to Egypt, where he hoped to find a safe asylum; but the ministers of Ptolemy betrayed him, and on landing he was stabbed by one of his former centurions.

Pon'ca, a tribe of Siouan Indians, who were deported to Oklahoma from Nebraska in 1877. In their new home sickness caused so many deaths that a portion of them returned to Nebraska, though many continued to reside with the Oto and Pawnee tribes.

Ponce de Leon, *pon'tha da la ohn'*, JUAN (1461-1521), one of the early Spanish explorers in America. He accompanied Columbus on his second expedition in 1493 and was commissioned to conquer the island of Porto Rico. Having there amassed great wealth, he set out for a country to the north, where, he had heard, there was a fountain of perpetual youth. He reached Florida in 1513, but failed in his quest. He was appointed governor of the "island" of Florida, on condition that he should colonize it. In 1521 he proceeded to take possession of his province. He was, however, met with hostility by the natives, and in a combat Ponce de Leon was mortally wounded.

Pondicherry, *pon'de sher're*, a town of India, capital of the French possessions there. It is on the east, or Coromandel, coast, 83 mi. s. s. w. of Madras. Its area is 115 square miles. It stands on a sandy beach and consists of two distinct parts, separated by a canal. The European quarter on the east, facing the sea, is regularly laid out about a handsome square and has well-built houses. The native quarter consists of houses, or huts, of brick or earth, besides a few pagodas. The trade of the city is of considerable importance, the chief exports being cotton stuffs, rice, nuts and hides. The town was first settled by the French in 1674. The Dutch gained possession of it about twenty years later, but were soon compelled to restore it to the French. It was, in the century and a quarter that followed, several times taken by the English, but it was finally restored to France in 1815.

Pontchartrain, *pon char trayn'*, a lake of Louisiana, 5 mi. n. of New Orleans. It is about 40 miles long and 25 miles wide. It communicates with Lake Borgne, Lake Maurepas and the Mississippi River and, by means of a canal, with New Orleans.

Pon'tiac (1720-1769), the famous chief of the Ottawa indians. For two years, beginning in 1763, Pontiac made war upon the whites, at the head of a great confederacy which he had organized, including most of the tribes west of the Alleghany Mountains and east of the Mississippi. At first the indians were everywhere successful, and only Niagara and Detroit were able to withstand his fierce assaults; but when peace was declared between France and England, Pontiac, deserted by many of his allies, surrendered. Pontiac was murdered by an Illinois indian, who, by this act, destroyed his tribe, for the northern tribes took summary vengeance on every Illinois they could find. Parkman's *Conspiracy of Pontiac* is a fascinating history of the great chief and his remarkable confederacy.

Pontiac, MICH., the county-seat of Oakland co., 26 mi. n. w. of Detroit, on the Clinton River and on the Grand Trunk and the Pontiac, Oxford & Northern railroads. Near the city are several hundred picturesque lakes, which afford good fishing and hunting and have on their shores many hotels, clubhouses and fine summer residences. The surrounding region is agricultural, and the city contains carriage factories, machine shops, a foundry, flour and lumber mills, a knit goods factory, gas engine works and other establishments. There is also a considerable trade in farm produce, fruit, vegetables and wool. The

Michigan Military Academy and the Eastern Michigan Asylum for the Insane are located here, and the city has a high school library and the ladies' library, eight churches and four banks. The place was settled about 1818, was named in honor of the famous indian chief Pontiac and was chartered as a city in 1861. Population in 1910, 14,532.

Pontoon, a flat-bottomed boat used as part of a bridge. Such boats, usually with square ends, are anchored in a line across a river or other body of water, and timbers and planks are then fastened across them. Pontoon bridges are now used chiefly for military purposes, because they can be quickly constructed and as quickly removed. Formerly they were made of logs, rafts or any other material which would bear weight; especially in war-time, every possible material that the neighborhood could supply was used. At the present time, however, every army has specially constructed pontoons, sometimes of wood, but frequently of aluminum or bamboo covered with canvas. The wood or metal frame is collapsible. In this way pontoons can be packed into small space, and each army can carry with it a complete equipment for building these temporary bridges.

Poodle, a small dog, distinguished by its long hair. The usual color is white, but black and blue poodles are known and highly valued. There are several varieties, most of which are kept for pets. One kind is used in some parts of England to hunt for truffles. The smallest poodles are kept for lap dogs and are affectionate little companions, with marked intelligence.

Pool, a game played on a table which differs from the common form of billiard table only in having six pockets, into which the balls may roll. These pockets occupy the four corners of the table and the middle of each side. There are a number of different games of pool, of which the following may be considered the more important.

Fifteen-ball pool is a game played with one cue ball and 15 object balls. At the beginning of the game these object balls are put in a frame and arranged in the form of a triangle in the middle of the foot of the table, with the apex pointing toward the players. The first player shoots from the head of the table at the triangle of balls and endeavors to knock them into the pockets. If he succeeds in putting one down, he shoots again, and so on until he misses a shot, when his opponent takes his turn, shooting from where the cue ball lies. After this manner the game is continued until all the balls are in the

pockets. Then each player counts as many points as he has put balls into the pockets. If at any time a player knocks the cue ball into a pocket, one of the balls which he has put down is placed on the table again at the foot. The next player places the cue ball again at the head of the table and shoots as at the beginning of the game. It is customary to *call the shot*, that is, to indicate the pocket into which an object ball is to be driven. In the common form of the game, all the object balls are of uniform red, but the game may be modified by having the object balls of different color, each bearing a number, in which case the count is made according to the numbers on the balls which are put into the pockets. Any number of people from two to a half-dozen may play the game.

Pin pool is played on a regular pool table or on a billiard table. Five small pins are placed in the center of the table on five spots, which are numbered as in the following diagram, in which the number 1 is toward the head of the table:

4
3 5 2
1

Each pin counts as many points as are indicated by the number of the spot on which it stands. Three balls are used, two object balls and a cue ball. At the beginning of the game the two object balls are placed on spots at the ends of the table, and the pins are placed in the center. The cue ball is shot from the head of the table at the farther object ball, with the purpose of knocking down the pins with either of the balls, after hitting the object ball. At the beginning of the game each player is given, usually from a leather bottle, a small ball, on which is marked a number. This number the player counts as the beginning of his score, but makes no announcement of it unless he wins the game, which consists of exactly 31 points. If a player's score becomes greater than 31 he "bursts" and loses all that he has made and must begin over. Whenever the pins are knocked down, they are put back upon the spots where they originally stood. If in any shot the player knocks down the four outer pins, leaving the center one standing, he wins the game. Any number may play.

Other games which are modifications of the two pool games described are numerous. Sometimes the leather bottle, one pin and an object ball are used, and the bottle and pin are set upon the table where they fall, the former counting 10 and the latter 5, and the game being any number previously determined on. A different game

may be played on the regular pool table, in which four balls are used, one counting 5, another, 3, and a third, 1, when put into the pockets. In this game the player scores also regular billiard shots. If the cue ball is put into the pocket at any time, the player loses all he has made in that turn and must give way to the next player. Whatever the number fixed for the limit of the game, it must be made exactly. If the person makes too many points, he loses all that were made in that turn.

Poole, WILLIAM FREDERICK (1821-1894), an American librarian, born at Salem, Mass., and educated at Yale. While there he was librarian of a literary society, and prepared the well-known *Index of Periodical Literature*, of which a second edition was published in 1853, and a third, with the assistance of the American and British Library Associations, in 1882. A supplement by Poole and W. J. Fletcher, of Amherst, was issued in 1888, and later supplementary volumes were published. From 1856 to 1869 he was librarian of the Boston Athenaeum; afterward he was employed as organizer of libraries and as librarian in various parts of the country, as at Waterbury, Conn., the naval academy at Annapolis, at Cincinnati, and at Chicago (the Public and the Newberry libraries).

Poo'na, a city of Bombay, British India, on the river Mutha, about 75 mi. s. e. of Bombay. The city is well built. It has the Deccan College for classics, mathematics and philosophy; a government college of science, with special training in civil engineering; normal schools, and other educational institutions, together with a public library and a hospital. It was the capital of the Peshwa, head of the Mahratta confederacy. It is a health resort and for a part of the year is the seat of the Bombay government. Its manufactures include gold and silver jewelry, small ornaments in brass and ivory, and silk and cotton fabrics. It is an important military station, and good roads connect it with other cities. Population, 160,000.

Poore, BENJAMIN PERLEY (1820-1887), an American journalist, born near Newburyport, Mass. He was sent to a military school to prepare for West Point, but ran away and became a printer's apprentice. At the end of his service his father bought the *Southern Whig* at Athens, Ga., and Poore edited this paper for two years, when he entered the diplomatic service of the United States at Brussels. Later he traveled extensively as the foreign correspondent of the *Boston Atlas*. Returning to America in 1848,

he became editor of the *Boston Bee* and *Sunday Sentinel* and also acted as correspondent of other papers at Washington. For many years he was clerk of the Senate committee on printing records and assisted in compiling and editing the *Political Register and Congressional Directory* and a descriptive catalogue of the government publications of the United States. He also wrote *The Conspiracy Trial for the Murder of the President*, biographies of Generals Taylor and Burnside and other works of biography and travel.

Popayan, *po pa yahn'*, a city of Colombia, situated near the Cauca River, at an elevation of about 5700 feet above the sea. Its chief buildings include a cathedral, a college and a theological seminary. The city is on the commercial route which extends through Quito to Trujillo, Peru, and is the center of an important trade. Population in 1910, estimated at 20,000.

Pope, the name given to the bishop of Rome, the head of the Roman Catholic Church. The emperor Phocas decreed that to the Roman pontiff exclusively belonged the distinction of universal bishop. St. Peter is regarded as the first of the pontiffs of the Roman Catholic Church, because of Christ's words, "And I say to thee; That thou art Peter, and upon this rock I will build my Church; and the gates of hell shall not prevail against it." According to tradition, Peter planted a church at Rome and died there a martyr.

Leo I, surnamed the Great (440-461), aimed to establish in the East and West a system of Papal vicariates, through which the Roman jurisdiction could be enforced and the Roman forms of faith permanently maintained. In the West he succeeded, but in the East his success was only partial and temporary. In 451 the Council of Chalcedon accepted the creed formulated by Leo, stating fully and clearly the belief in the union of the divine and human natures of Christ in one person. The fact that in 452, armed with none but spiritual weapons, Leo went out to meet the terrible Attila and actually induced him to leave Italy without attacking Rome, is a convincing proof of the faith of the pope and the power of the Church at this time.

During the German occupation of Italy, the relations of the popes with the barbarian rulers were friendly, and the Church continued to prosper. Under the Byzantine sovereignty, the prestige of the Church seemed in danger of disappearing. But this calamity was averted

by the invasion of the Lombards, who drove the Byzantine garrisons from the country. During the following centuries of change, confusion and ruin, the Christian Church alone retained its organization. Even the Lombards were in time converted to Christianity, and the people who, until the overthrow of the emperor, had been accustomed to depend upon Rome for guidance in temporal affairs now continued to look thither for spiritual control, and the bishop of Rome was acknowledged throughout western Europe as the head of the Church. Thus for centuries the papacy gained strength, the Christian fathers, Augustine, Gregory the Great and a host of other active men, shaping its doctrines and policy. In 754 Pepin I, the Frankish king, expelled the Lombards from their recent conquests and guaranteed to the papacy the temporal sovereignty of a stretch of territory including Rome and a considerable surrounding country (See PAPAL STATES). In the year 800, Pope Leo III crowned Pepin's son Charlemagne Holy Roman Emperor, thus restoring the Western Empire. Many causes now combined to extend the power of the Church. During the political strife of the Dark Ages the Church afforded a refuge to the oppressed. In the convents and monasteries alone did learning flourish. Priests were therefore the teachers, secretaries and ambassadors of kings.

Gradually the bishops acquired the right to try all cases relating to marriage, trusts, perjury, simony, or concerning widows, orphans or Crusaders, and even some criminal cases. Thus by the end of the twelfth century the Church had absorbed not only the whole legislative power over the clergy, but in part over the laity also. Consequently, the principle was established that all cases might be appealed from the courts of the bishops and archbishops of the different European countries to the pope. The pope thus came to be regarded as the fountain of justice and the supreme judge of Christendom, while emperors and kings bore the sword simply as his ministers to carry into effect his sentences and decrees.

In the tenth century, when Otto the Great assumed the title of Holy Roman Emperor, there began between the pope and the emperor a contest for supremacy which lasted many centuries. During this time all Christendom was virtually divided into two parties, the members of which were respectively supporters of the imperial or the papal claims. The Crusades greatly strengthened the papal power, as

the prominent part which the popes took in them naturally fostered the papal authority, by placing in the hands of the popes the armies and resources of Christendom and accustoming the people to look to them as guides and leaders.

Pope Gregory VII, or Hildebrand, by means of excommunication and interdict, carried on two important reforms, the enforcement of celibacy among the secular clergy and the suppression of simony, thus doing much toward establishing the universal spiritual and temporal sovereignty of the pope. In the thirteenth century the papal power gained a signal triumph over the imperial party by its victory over the House of Hohenstaufen. In the period which follows, the authority of the popes was at its height. Under Pope Innocent III (1198-1216) almost all the kings and princes of Europe swore fealty to the pope as their overlord.

One of the severest blows given both the temporal and the spiritual authority of the popes was the removal in 1309 of the papal chair from Rome to Avignon, France. During the seventy years or so while it remained there, all the popes were French and, their policies being shaped according to French ideas, the papacy ceased to possess that sacred cosmopolitan character which had hitherto characterized it. The Catholic world was not again united under a spiritual head until the election of Martin V in 1417. But the temporal rulers of France, Germany and England, taking advantage of the disturbed condition of the papal see, successively revolted and freed themselves from the authority of the papacy as touching political or governmental affairs. They continued, however, to recognize the pope as the head of the Church and the rightful arbiter in all spiritual matters. In the sixteenth century the popes took such a prominent part in the political movements of Europe that their territory and jurisdiction were greatly extended, but the opposition which had been slowly gathering in the North culminated in the Protestant Reformation, which directly challenged the traditional supremacy of the papacy. The answer of the Church was clearly set forth in the decrees of the Council of Trent (1543-1553), which reaffirmed in unmistakable terms the beliefs of the Church of Rome.

At the close of the eighteenth century and in the nineteenth, changes took place in Europe which closely affected the papal power. In 1797 the pope was obliged to cede several of the states of the Church to Napoleon. A year later the remaining papal States were erected

into a Roman republic, but in 1801 the papal power was partly restored over them. In 1808-1809 they were incorporated in the French Empire, but were again restored by the aid of the Austrians in 1815. When Pius IX ascended the papal throne in 1846, his chief aim was to bring about a confederation of the Italian states under the papal supremacy. With this object in view, he placed himself at the head of the movement for reform, reorganized the municipal government of Rome and granted a constitution to the Papal States. In 1848 Pius was forced to flee to Gaeta, while Rome was proclaimed a republic. In 1850 he was restored to his rightful place by the aid of the French. In 1860 a large part of his dominions was annexed by Victor Emmanuel, and in 1870 the remnant of the Papal States voted for union with the kingdom of Italy, depriving the pope of dominion. In accordance with the conviction of Roman Catholics generally, that it is not fitting that the head of the Church be subject to any temporal ruler, the pope has since 1870 remained in the Vatican, where his jurisdiction is still supreme. In spiritual matters, the papal authority has, however, never been stronger than at the opening of the twentieth century, and even in temporal affairs the papal influence continues to make itself felt through the pope's viceregents in every land.

By the decrees of the Vatican Council of 1870, the pope has supreme power in matters of discipline and faith over all and each of the pastors and of the faithful. It is further taught by the Vatican Council that when the pontiff speaks *ex cathedra*, that is, when he, in virtue of his apostolic office, defines a doctrine of faith and morals to be held by the whole Church, he possesses infallibility, by divine assistance. The pope cannot annul the constitution of the Church as ordained by Christ. He may condemn or prohibit books, alter the rites of the Church and reserve to himself the canonization of saints. A pope has no power to nominate his successor, election being entirely in the hands of the cardinals, who are not bound to choose one of their own body. The papal insignia are the tiara, or triple crown, the straight crosier and the pallium. He is addressed as "Your Holiness."

We subjoin a table of the popes, according to the Roman Notizie, with the dates of the commencement of their pontificates. The names printed in italics are those of anti-popes.

Pope

St. Peter.....	A. D.	42
St. Linus.....		66
St. Anacletus.....		78
St. Clement I.....		91
St. Evaristus.....		100
St. Alexander I.....		108
St. Sixtus I.....		119
St. Telephorus.....		127
St. Hyginus.....		139
St. Pius I.....		142
St. Anicetus.....		157
St. Soterus.....		168
St. Eleutherius.....		177
St. Victor I.....		193
St. Zephyrinus.....		202
St. Calixtus I.....		217
St. Urban I.....		223
St. Pontianus.....		230
St. Anterus.....		235
St. Fabian.....		236
St. Cornelius.....		250
St. Lucius I— <i>Novatianus</i>		252
St. Stephen I.....		253
St. Sixtus II.....		257
St. Dionysius.....		259
St. Felix I.....		269
St. Eutychianus.....		275
St. Caius.....		283
St. Marcellinus.....		296
(See vacant 3 years and 6 months.)		
St. Marcellus I.....		308
St. Eusebius.....		310
St. Melchades or Melitades.....		311
St. Sylvester I.....		314
St. Marcus.....		336
St. Julius I.....		337
Liberius.....		352
St. Felix II (sometimes reckoned an anti-pope).....		355
St. Damasus I.....		366
St. Siricius.....		384
St. Anastasius I.....		398
St. Innocent I.....		402
St. Zosimus.....		417
St. Boniface I— <i>Eulalius</i>		418
St. Celestine I.....		422
St. Sixtus III.....		432
St. Leo I, the Great.....		440
St. Hilary.....		461
St. Simplicius.....		468
St. Felix III.....		483
St. Gelasius I.....		492
St. Anastasius II.....		496
St. Symmachus.....		498
St. Hormisdas— <i>Lawrence</i>		514
St. John I.....		523
St. Felix IV.....		526
Boniface II— <i>Dioscorus</i>		530
John II.....		533
St. Agapetus I.....		535
St. Sylvester.....		536
Vigilius.....		537
Pelagius I.....		555
John III.....		560
Benedict (I) Bonosus.....		574
Pelagius II.....		578
St. Gregory I, the Great.....		590
Sabinianus.....		604
Boniface III.....		607
St. Boniface IV.....		608
St. Deusdedit.....		615
Boniface V.....		619
Honorius I.....		625
(See vacant 1 year and 7 months.)		
Severinus.....		640
John IV.....		640
Theodoros I.....		642
St. Martin I.....		649
St. Eugenius I.....		654
St. Vitalianus.....		657
Adeotatus.....		672
Donus or Domnus I.....		676
St. Agathon.....		678
St. Leo II.....		682
St. Benedict II.....		684
John V.....		685
Conon — <i>Theodorus</i>		686
<i>Paschal</i>		687
St. Sergius I.....		701
John VI.....		705
John VII.....		708
Sisinnius.....		708
Constantine.....		715
St. Gregory II.....		731
St. Gregory III.....		741
St. Zachary.....		752
Stephen II (died before consecration).....		752
Stephen III.....		752
<i>Paul I—Constantine</i>		757
<i>Theophylactus</i>		768
<i>Philip</i>		772
Adrian I.....		795
St. Leo III.....		816
Stephen V.....		817
St. Paschal I.....		824
Eugenius II.....		827
Valentinus.....		827
Gregory IV.....		844
Sergius II.....		847
St. Leo IV.....		855
Benedict III— <i>Anastasius</i>		858
St. Nicholas I.....		867
Adrian II.....		872
John VIII.....		882
Marinus I, or Martin.....		884
Adrian III.....		885
Stephen VI.....		891
Formosus.....		896
Boniface VI (reigned only 18 days).....		896
Stephen VII.....		897
Romanus.....		898
Theodorus II — <i>Sergius III</i>		898
John IX.....		900
Benedict IV.....		903
Leo V.....		903
Christopher.....		904
Sergius III.....		911
Anastasius III.....		913
Lando.....		914
John X.....		923
Leo VI.....		929
Stephen VIII.....		931
John XI.....		936
Leo VII.....		939
Stephen IX.....		943
Marinus II, or Martin III.....		946
Agapetus II.....		95
John XII— <i>Leo VIII</i>		964
Benedict V.....		965
John XIII.....		972
Benedict VI.....		974
Donus or Domnus II.....		975
Benedict VII.....		983
John XIV— <i>Boniface VII</i>		985
John XV.....		996
Gregory V — <i>John XVI</i>		999
Sylvester II.....		1003
John XVI or XVII.....		1003
John XVII or XVIII.....		1009
Sergius IV.....		1012
Benedict VIII— <i>Gregory VI</i>		1024
John XVIII or XIX.....		1033
John XIX (deposed) — <i>John XX</i>		1045
Gregory VI— <i>Sylvester III</i>		1046
Clement II.....		1046
Damasus II— <i>Benedict IX</i> attempts to resume the throne.....		1048
St. Leo IX.....		1049
Victor II.....		1055
Stephen X.....		1057

Pope

Benedict X.....	1058
Nicholas II.....	1058
Alexander II— <i>Honorius II</i>	1061
Gregory VII (Hildebrand) — <i>Clement III</i>	1073
(See vacant 1 year.)	
Victor III.....	1086
Urban II.....	1088
Paschal II.....	1099
Gelasius II— <i>Gregory VIII</i>	1118
Calixtus II.....	1119
Honorius II— <i>Celestine II</i>	1124
Innocent II— <i>Anacletus II</i> ; <i>Victor IV</i>	1130
Celestinus II.....	1143
Lucius II.....	1144
Eugenius III.....	1145
Anastasius IV.....	1153
Adrian IV (Nicholas Breakspear, an Englishman).....	1154
Alexander III— <i>Victor V</i> ; <i>Paschal III</i> ; <i>Calixtus III</i> ; <i>Innocent III</i>	1159
Lucius III.....	1181
Urban III.....	1185
Gregory VIII.....	1187
Clement III.....	1187
Celestinus III.....	1191
Innocent III.....	1198
Honorius III.....	1216
Gregory IX.....	1227
Celestinus IV.....	1241
(See vacant 1 year and 7 months.)	
Innocent IV.....	1243
Alexander IV.....	1254
Urban IV.....	1261
Clement IV.....	1265
(See vacant 2 years and 9 months.)	
Gregory X.....	1271
Innocent V.....	1276
Adrian V.....	1276
John XIX or XX or XXI.....	1276
Nicholas III.....	1277
Martin IV.....	1281
Honorius IV.....	1285
Nicholas IV.....	1288
(See vacant 2 years and 3 months.)	
St. Celestinus V.....	1294
Boniface VIII.....	1294
Benedict XI.....	1303
Clement V (papacy removed to Avignon).....	1305
(See vacant 2 years and 3 months.)	
John XXII.....	1316
Benedict XII— <i>Nicholas V at Rome</i>	1334
Clement VI.....	1342
Innocent VI.....	1352
Urban V— <i>Clement VII</i>	1362
Gregory XI (throne restored to Rome).....	1370
Urban VI.....	1378
Boniface IX— <i>Benedict XIII at Avignon</i>	1389
Innocent VII.....	1404
Gregory XII.....	1406
Alexander V.....	1409
John XXIII.....	1410
Martin V — <i>Clement VIII</i>	1417
Eugenius IV — <i>Felix V</i>	1431
Nicholas V.....	1447
Calixtus III.....	1455
Pius II.....	1458
Paul II.....	1464
Sixtus IV.....	1471
Innocent VIII.....	1484
Alexander VI.....	1492
Pius III.....	1503
Julius II.....	1503
Leo X.....	1513
Adrian VI.....	1522
Clement VII.....	1523
Paul III.....	1534
Julius III.....	1550
Marcellus II.....	1555
Paul IV.....	1555
Pius IV.....	1559
St. Pius V.....	1566
Gregory XIII.....	1572
Sixtus V.....	1585
Urban VII.....	1590
Gregory XIV.....	1590
Innocent IX.....	1591
Clement VIII.....	1592
Leo XI.....	1605
Paul V.....	1605
Gregory XV.....	1621
Urban VIII.....	1623
Innocent X.....	1644
Alexander VII.....	1655
Clement IX.....	1667
Clement X.....	1670
Innocent XI.....	1676
Alexander VIII.....	1689
Innocent XII.....	1691
Clement XI.....	1700
Innocent XIII.....	1721
Benedict XIII.....	1724
Clement XII.....	1730
Benedict XIV.....	1740
Clement XIII.....	1750
Clement XIV.....	1769
Pius VI.....	1775
Pius VII.....	1800
Leo XII.....	1825
Pius VIII.....	1829
Gregory XVI.....	1831
Pius IX.....	1846
Leo XIII.....	1878
Pius X.....	1903
Benedict XV.....	1914

Pope, ALEXANDER (1688-1744), a celebrated English poet. As he was sickly and deformed, his education was desultory; he picked up the rudiments of Greek and Latin from the family priest and was successively sent to two schools, one at Twyford, the other in London. Before he was fifteen he attempted an epic poem, and by the time he was eighteen he had finished the *Pastorals*, which, when they were published in 1709, attracted much notice. In 1711 he published his poetical *Essay on Criticism*, which was followed by *The Rape of the Lock*, a polished and witty narrative poem, founded on an incident of fash-

ionable life. His next publications were *The Temple of Fame*, a modernization and adaptation of Chaucer's *House of Fame*; *Windsor Forest*, a pastoral poem, and *The Epistle of Eloisa to Abelard*. From 1713 to 1726 he was engaged on a poetical translation of Homer's works, the *Iliad* being wholly from his pen, the *Odyssey* only half. The *Iliad*, while it does not reproduce the spirit of the original, is a brilliant production. The critic Bentley, on first reading the translation, said: "It is a pretty poem, Mr. Pope, but you must not call it Homer." In 1728 Pope published his *Dunciad*, a mock heroic poem, intended to overwhelm his antagonists with ridicule; and in 1742 he added to it a fourth book, in which he ridiculed Colley Cibber, then poet laureate. The *Dunciad* was followed by *Imitations of Horace* and by *Moral Essays*, one of which was the *Essay on Man*.

In his own day, Pope was considered the greatest of all English poets. Later judgment modified this estimate greatly, and by some it has been denied that Pope was a poet at all, in the true sense of the term. But while he had little genuine feeling and little imagination, he was brilliant and had the art of expressing things neatly, so that he is more quoted than any other English poet except Shakespeare.

Pope, JOHN (1822-1892), an American soldier, born at Louisville, Ky., and educated at West Point. He entered the engineering service, fought in the Mexican War under Taylor, took part in government and private surveys in the West after its close, and at the opening of the Civil War was made brigadier general, in command of the northern district of Missouri. He drove the Confederates from the state, coöperated with Foote in the capture of Island No. 10, participated in the battle at Corinth and was made brigadier general in the regular army, with command of the Army of Virginia. He was made major general in the regular army in 1882.

Pop'lar, a well-known genus of hardy trees, belonging to the same family as the willow. The leaves are broad, with long and slender footstalks, flattened vertically, which generally gives them more or less of a tremulous motion. About eighteen species have been observed, natives of Europe, central and northern Asia and North America. Some of the poplars are the most rapid growers of all hardy forest trees. They thrive under a variety of conditions as regards soil and climate, but they do best in damp ground. The timber of the poplar is white, light and soft and is not very valuable. The Lombardy poplar is

distinguished by its branches, which grow upward and quite close to the trunk. The common poplar of the United States is often called *cottonwood*, because of the cotton-like fiber which appears with the blossoms.

Poplar Bluff, Mo., the county-seat of Butler co., is on the Big Black River and the Saint Louis, Iron Mountain & Southern Railroad, 74 mi. s. by w. of Cairo, Ill. It has large lumber industries and stockyards, and manufactures foundry products. It is also an important shipping point. Population in 1910, 6916.

Popocatepetl, *po po'ka ta pet'l*, (smoking mountain), a volcano in Mexico, in the State of Puebla, 26 mi. w. of the city of Puebla. It is semi-active. Its height is about 17,500 feet and its crater is about 2600 feet in diameter and from 600 to 700 feet deep. It contains large quantities of the purest sulphur, which until comparatively recently has not been commercially valuable. Forests cover the base of the mountain, but its summit is covered with snow. The last great eruption of the volcano was in 1548.

Pop'py, the common name for plants bearing



POPPY

large, brilliant flowers, that last usually but a single day. The white poppy yields the well-

Popular Sovereignty

known opium of commerce (See OPIUM). Most of the species are natives of Europe. They often occur as weeds in fields and waste places and are frequently cultivated in gardens for ornament. The seeds of the white poppy yield a harmless oil, employed for culinary purposes; and the oil-cake is used for feeding cattle. The roots of the poppy are annual or perennial; the calyx is composed of two leaves, and the corolla has four petals; the stamens are numerous, and the capsule is one-celled, with several longitudinal partitions and a multitude of seeds.

Popular Sovereignty. See SQUATTER SOVEREIGNTY.

Population. The power of propagation inherent in all organic life may be regarded as infinite. There is no one species of vegetable or animal, which, under favorable conditions as to space, climate and food (that is to say, if not crowded and interfered with by others), would not in a small number of years overspread every region of the globe. To this property of organized being the human species forms no exception. Taking mankind in the mass, the individual desire to contribute to the increase of the species may be held to be universal, but the actual growth of population is nowhere left to the unaided force of this motive, and nowhere does any community increase to the extent of its theoretical capacity, even though the growth of population has come to be commonly considered as an indispensable sign of the prosperity of a community. For one thing, population cannot continue to increase beyond the means of subsistence, and every such increase must lead to a destruction of life. The possibility of such increase has been denied by some economists. But if population is limited by the means of subsistence, it will only be checked or arrested by this agency, after it has exceeded the means of subsistence. It becomes of great importance, then, to inquire by what kind of checks population is actually arrested. This inquiry was first systematically treated in an *Essay on the Principle of Population*, published in 1798 by the Rev. T. R. Malthus. Malthus argued that population increases in a geometrical ratio, while the means of subsistence increase only in an arithmetical ratio; that, therefore, the normal tendency of population has always been to press continuously upon the means of subsistence. But, he says, there have been two classes of checks at work limiting the increase of population, preventive and positive; the one, consisting of those causes which prevent births, such as vice, disease and moral

Populist Party

restraint; the other, of those which, by abbreviating life, cut off actual excesses of population, such as war, famine and disease.

The population of the world at the beginning of the twentieth century is not far from a billion and a half. The latest estimates give the following density of population:

	AREA IN THOUSANDS OF Sq. Mi.	POPULATION IN MILLIONS	PERSONS PER Sq. Mi.
Asia.....	17,296	868	50.18
Africa.....	11,500	178	15.47
Australasia.....	3,740	6.4	1.71
America.....	16,000	150	9.37
Europe.....	3,800	394	103.68

Pop'ulist Party or **People's Party**, a political party in the United States, organized in 1891 by a convention of delegates representing chiefly the agricultural and laboring classes. It was the outgrowth of the Granger (See GRANGE) and Farmers' Alliance movements, and its first platform demanded the free coinage of silver, the abolition of national banks, the issue of paper currency in sufficient amounts to relieve the demand for money, the national ownership of all public utilities, a graduated income tax, popular election of United States senators, the initiative and referendum and the prohibition of ownership of American lands by aliens. In 1892 the party nominated James B. Weaver of Iowa for president and James G. Field of Virginia for vice-president, and it polled more than a million votes and received twenty-two electoral votes. In 1896 the party endorsed William Jennings Bryan, the candidate of the Democrats, but nominated an independent candidate for vice-president, Thomas E. Watson of Georgia, though a great majority of the party supporters voted for the Democratic candidate, Arthur Sewall. Those who insisted upon maintaining the party organization and voted for Watson were called "middle of the road" Populists. In 1900 the party again accepted the Democratic candidate, W. J. Bryan, but it again nominated an independent nominee for the vice-presidency, Charles A. Towne of Minnesota. Towne later withdrew, however, and Stevenson was substituted by the national executive committee of the party. In 1904 and again in 1908 Thomas E. Watson of Georgia was the presidential candidate, but at each election the party polled only a small number of votes, many of its former adherents having joined the Independent or Socialist parties.

Por'cupine, the name of certain animals whose bodies are covered, especially on the back, with quills, or dense, solid, spine-like structures, intermixed with bristles and stiff hairs. The muzzle is generally short and pointed and the ears are short and rounded. The *common*, or *crested*, *porcupine*, found in southern Europe and in northern Africa, is the best-known species. Its general color is a grizzled, dusky black. When fully grown it measures nearly two feet in length, and some of its spines exceed one foot.



PORCUPINE

The spines in their usual position lie nearly flat, with their points directed backward; but when the animal is excited they are erected and afford strong protection against an enemy. The quills are loosely inserted in the skin and may, on being violently shaken, become detached—a circumstance which has given rise to the false statement that the animal possesses the power of throwing its quills, like arrows or darts, at an enemy. These animals burrow during the day, and at night they search for food, which consists chiefly of vegetable matter. Of the American species, the *Canadian*, or *North American*, *porcupine*, is the best known. It is about two feet long and is of slow and sluggish habits. The quills of this species are short and are concealed among the fur. The largest porcupines are found in India, and these have pure white bristles.

Por'gy or **Porgee**, a fine food fish, common in the Mediterranean Sea and in the Pacific and Atlantic oceans. There are several different species, and different names are given the fish in different localities. The species most common along the Atlantic coast is known as the *scup*.

Pork, the flesh of the hog. In the United States pork is more generally used than any other meat. Large quantities are also shipped to European countries. The variety of products is greater than from any other kind of meat. Pork contains more fat than beef or mutton, is not so easily digested and needs to be thoroughly cooked. The annual output of pork products

in the United States is over \$100,000,000. See BACON; HAM; LARD; SAUSAGE.

Poros'ity, the property of possessing pores. All substances are porous. Some, like sponge and bread, have large pores, while others, like iron and gold, have extremely small ones. We know that such substances as iron and other metals are porous, because water and some kinds of gas can be forced through thin layers of them, when sufficient pressure is used.

Porphyry, *por'fi ry*, the name given to a class of rocks which have the crystals of one mineral scattered more or less evenly through the mass of another. Feldspar forms the mass in most varieties. Some porphyries are incorrectly called marble. Porphyries vary greatly in color. Some are dark green, others are dark red, while still others are of various shades of ochre. All varieties are hard; they take and retain a high polish and are valuable building stones.

Porpoise, *por'pus*, a genus of mammals belonging to the dolphin family of the Cetacea. The common porpoise occurs plentifully off the British coast and in the North Sea. Its average length is five feet. The skin, which is perfectly hairless and about an inch thick, makes a flexible leather and is used much in the manufacture of shoestrings and other small articles. The porpoise feeds almost entirely on herrings and other fish and is usually seen in large schools. An allied species is the *round-headed*, or *caving*, *whale* of Shetland. This latter is about twenty-four feet in length and is hunted for the sake of the valuable oil, which is found just beneath the skin, and also for its flesh. See DOLPHIN.

Port'age, Wis., the county-seat of Columbia co., 35 mi. n. of Madison, on the Wisconsin River, at the terminus of the ship canal to the Fox River, and on the Wisconsin Central and the Chicago, Milwaukee & Saint Paul railroads. It is in a productive agricultural region, has a large trade and contains manufactures of flour, brick, hosiery, knit goods, farm implements and other articles. The city has a public library, contains good high school and municipal buildings and owns the waterworks. The ruins of Fort Winnebago are in the vicinity. The place was settled in 1835 and was chartered as a city in 1854. Population in 1910, 5440.

Port Arthur, a city situated at the extremity of the Liao-tung peninsula in Manchuria and on the Strait of Pe-chi-li. It is the terminus of one of the branches of the Trans-Siberian railway and is also has an excellent harbor. The town was fortified and made a naval station by the Chinese

in 1891. Three years later it was captured by the Japanese, but the European powers compelled them to release the port when the Chino-Japanese War was settled. In 1898 Port Arthur was leased by the Russians, who proceeded to fortify it strongly. It was the scene of a memorable siege during the Russo-Japanese War, and on June 1, 1905, it surrendered to the Japanese, under whose control it still remains.

Port Arthur, a city of Ontario, Canada, situated at the head of Lake Superior, $2\frac{1}{2}$ miles from Fort William. The Canadian Pacific, Canadian Northern and Grand Trunk Pacific railways make it an important shipping point for the west, and it sends great quantities of grain, lumber and iron ore eastward to ports on the Great Lakes. The largest grain elevator in the world, with a capacity of 7,500,000 bushels, is located here. Population in 1911, 11,200.

Port Arthur, TEX., a seaport of Jefferson co., on Sabine Lake and the Kansas City, Southern and other railroads, 20 mi. s. e. of Beaumont. There are extensive oil fields in the vicinity and the surrounding country is fertile. Through the Port Arthur Ship Canal, constructed by deepening the channel of Sabine Pass, the outlet of Sabine Lake, and by the construction of jetties at the mouth, the largest ocean steamers have been enabled to enter the port. Port Arthur is an important shipping point for lumber, farm produce, live stock and petroleum. Population in 1910, 7663.

Port-au-Prince, *por to pran's*, or **Port Republicain**, capital of the Republic of Haiti, on the western side of the island, at the southeast extremity of the Bay of Gonaives. It is built on a low and unhealthful plateau, consists chiefly of wooden houses, and has a palace, a senate house, a cathedral, a customhouse, a mint and a hospital. The chief exports are redwood, coffee and coconuts. Population, about 60,000.

Port Chester, N. Y., a village in Westchester co., 26 mi. n. e. of New York City, on Long Island Sound and on the New York, New Haven & Hartford railroad. It is a residence suburb and summer resort. It contains foundries, carriage works, screw and bolt factories, a woolen mill and other manufacturing establishments. The place was settled about 1742, was called Saw Pit until 1837 and was incorporated in 1868. Population in 1910, 12,809.

Port Elizabeth, a city of Cape of Good Hope, situated at the west end of Algoa Bay, about 425 mi. e. of Cape Town. Its harbor is protected by jetties, and it has an extensive com-

merce. It is considered the second town of importance in the colony. Population in 1911, 18,190.

Porter, DAVID (1780-1843), an American naval officer, born at Boston. He early went to sea and suffered impressment by British vessels, but escaped and entered the United States navy in 1798. He served on the *Constellation* in the famous battle with the *Insurgent*, and was captured by the Barbary pirates in 1803, while serving on the *Philadelphia*. As commander of the *Essex* in the War of 1812, he captured many British vessels. At the close of the war he was made



DAVID PORTER

commodore, commanded expeditions against the West Indian pirates and was suspended from the service for compelling the Spanish authorities at Porto Rico to apologize for an insult to his flag, thus exceeding his express authority. He resigned and entered the Mexican navy, but left it in 1829 and thereafter served the United States as consul general to the Barbary powers and as *charge d'affaires* at Constantinople. He was father of Admiral David Dixon Porter, and in 1809 he adopted David Glasgow Farragut as a son.

Porter, DAVID DIXON (1813-1891), an American naval officer, born in Chester, Pa. He entered the United States navy as a midshipman in 1829, served during the entire Mexican War and was in every action on the coast. At the beginning of the Civil War he was placed in command of the steam frigate *Powhatan*, and his services soon won for him the rank of commander. In command of a mortar fleet he ren-

dered assistance in the reduction of forts Jackson and Saint Philip and in the capture of Arkansas Post. His able coöperation with Grant in the siege of Vicksburg gained him a commission as rear admiral. In 1865, while in command



DAVID D. PORTER

of the North Atlantic blockading squadron, he, with General Terry, captured Fort Fisher. In 1866 he was promoted to vice-admiral, and in 1870 he was appointed admiral.

Porter, JANE (1776-1850), an English novelist. Her most important novels were *Thaddeus of Warsaw* and *Scottish Chiefs*, the latter the best historical romance up to the time of Scott.

Porter, NOAH, (1811-1892), an American philosopher, writer and educator, born at Farmington, Conn. He was graduated from Yale College in 1831 and for the next fifteen years served as pastor of Congregational churches in New Milford, Conn., and Springfield, Mass. When the Clark professorship of metaphysics was established at Yale, Doctor Porter was the first to fill the chair, and he held the position during the remainder of his life. In 1871 he was elected president of Yale University and retained the position for fifteen years, when he resigned. During his presidency Doctor Porter taught the classes in his department, preached in the college church and engaged in literary work. He attained his widest reputation as editor in chief of two standard editions of Webster's Dictionary. The best known of his published works are *The Human Intellect*, which for a quarter of a century was a standard textbook on psychology, and *The Elements of Moral Science*.

Port Hudson, SIEGE OF, a siege in the Civil War, conducted by Federal forces under Gen-

eral Banks against the village of Port Hudson, Louisiana, which had been strongly fortified by the Confederates and was occupied by a force under General Gardner. The siege began March 26, 1863, after Admiral Farragut had secured control of the river on both sides of the town. Several unsuccessful assaults were made, but finally, on July 7, when the news of the surrender of Vicksburg reached Port Hudson, Gardner surrendered the garrison, numbering about 6000.

Port Huron, MICH., the county-seat of Saint Clair co., 60 mi. n. e. of Detroit, on Lake Huron, at the head of the Saint Clair River and at the mouth of the Black River, and on the Pere Marquette and two lines of the Grand Trunk railroad. The city is built on both sides of the Black River, and there is a railroad tunnel under the Saint Clair River to Sarnia, Canada. Port Huron has connection by boat with the other ports on the Great Lakes and conducts a large trade. There are several dry docks and ship-building yards, engine and thresher works, railroad shops, foundries and various other factories. The climate, scenery, mineral springs and fishing facilities have made the place a popular summer resort. It has a Carnegie library, a law library, two business colleges, more than thirty churches, four banks, a public hospital and home and several public parks. Other prominent structures are the Federal building, the city hall, the courthouse, Maccabee Temple and a number of good business blocks. The place was settled by a French colony in 1790, and was known by various names until its organization as the village of Port Huron in 1849; it was chartered as a city in 1857. Population in 1910, 18,863.

Port Jervis, JUVVIS, N. Y., a village in Orange co., 88 mi. n. w. of New York City, on the Erie and the New York, Ontario & Western railroads and on the Delaware River at the mouth of the Neversink, near the junction of the New York, New Jersey and Pennsylvania state lines. It is in a picturesque region containing many waterfalls, and has become a popular summer resort. It has a Y. M. C. A. building, a Carnegie library, an orphanage and a hospital. There are large railroad shops, glove factories, plating works and manufactories of neckties, overalls, saws and other articles. The place was settled in the last of the eighteenth century, and it was laid out as a village in 1826. Population in 1910, 9564.

Portland, MAINE, the county-seat of Cumberland co., 63 mi. s. by w. of Augusta and 108

Portland

mi. n. by e. of Boston, Mass., on Casco Bay and on the Maine Central, the Boston & Maine and the Grand Trunk railroads. It is the largest city and the commercial metropolis of the state and covers an area of more than 17 square miles. The streets are regularly laid out, and there are about 115 acres of parks, containing a soldiers' monument and a fine bronze statue of Longfellow. The city has a public library and that of the Maine Historical Society, more than fifty churches, a medical college, two high schools, public kindergarten and manual training schools, parochial schools and two business colleges. The charitable institutions include the Maine General Hospital, the United States Marine Hospital and homes for orphans and for aged men and aged women. The birthplaces of Longfellow and Neal Dow and the Longfellow mansion, where the poet lived, are of interest. Other prominent buildings are the city hall, the armory, the customhouse, the postoffice, the Cathedral of the Immaculate Conception, Saint Luke's Cathedral, Union Depot, Mechanics' Hall, several large hotels and a number of business blocks.

Portland has a deep harbor and has been an important trading center since colonial times. It has an extensive coastwise trade, and at least six foreign steamship lines make connection here. The port has large warehouses and grain elevators and is a very important shipping port for Canada. The industrial establishments of Portland include locomotive and car works, rolling mills, hat factories, boot and shoe shops, tanneries, foundries, machine shops and other factories.

The place was settled in 1632 and was known by the indian name of Machigonne. It was then successively called Stogomer, Casco Neck and Falmouth. In 1676 the village was destroyed by indians, and after other settlers had come the place was again ravaged in 1690. In 1715 a settlement was made which proved permanent. It was incorporated as the town of Portland in 1786 and was chartered as a city in 1832. Population in 1900, 50,145; in 1910, 58,571.

Portland, ORE., the county-seat of Multnomah co. and the chief city of the state, is situated on the Willamette River, 12 mi. from its junction with the Columbia, about 100 mi. from the Pacific coast and 772 mi. n. of San Francisco. It is on the Southern Pacific, the Union Pacific, the Northern Pacific, the Great Northern and other railroads. The city is

Porto Rico

beautifully situated on both banks of the Willamette River, which rise gradually to the hills on the west and to higher level land on the east. It is regularly laid out, has broad, well paved streets lined with shade trees, contains many substantial public buildings and metropolitan business blocks and has beautiful homes and many public parks, some of them in their natural wild beauty. There are also public playgrounds. Educational facilities are broad. There are excellent grade and high schools, private schools and business colleges, besides the college-preparatory schools, including the Portland Academy, Hill Military Academy and Saint Helen's Hall. There are also Portland University, Reed Institute, Saint Michael's College and the law and medical schools of the University of Oregon.

Portland is an important industrial and commercial center. It has a fresh-water harbor which admits the largest ocean steamers. It is one of the leading lumber ports in the world, and the second largest city in the United States in wheat export, being surpassed only by New York City. The chief manufacturing industries consist of the making of lumber, machinery, woolen goods, flour, fur garments, furniture, paints, oils and soap. There are numerous plants of minor importance. The exports of the city include lumber, wheat, oats, flour, fruit, salmon and wool. The extent and rapid development of these industries have made Portland one of the wealthiest cities of its size in the United States. From Portland Heights an extensive view of the surrounding country can be obtained. Population in 1910, 207,214.

Portland, ISLE OF, a peninsula of England, extending into the English Channel. It is about $4\frac{1}{2}$ miles long and 2 miles wide. It is the seat of one of the greatest English prisons and also has a large harbor formed by breakwaters, one of which is 2 miles long. Population about 16,000.

Port Louis, loo'is, the capital of the island of Mauritius, is situated at the head of a bay on the northwest side of the island. Its harbor is strongly fortified, and the town contains a number of pretentious buildings, including two cathedrals, a gymnasium, a theater, a mint, schools and an astronomical observatory. It is also the terminus of two lines of railway. Population in 1911, with suburbs, 50,060.

Port'o Rico, re'ko, one of the West India islands, situated between $17^{\circ} 50'$ and $18^{\circ} 30'$ north latitude and between $65^{\circ} 30'$ and $67^{\circ} 15'$

Porto Rico

west longitude, 1000 mi. e. by s. of Key West and 1500 mi. s. e. of New York. The island is nearly rectangular in outline, is about 100 miles long and averages a little over 30 miles in width. Its area, including a number of small islands around the coast, is 3670 square miles, or about three-fourths that of Connecticut.

SURFACE AND DRAINAGE. A range of low mountains or hills extends across the island in an east and west direction. These have an altitude of from 2000 to 3000 feet, and the highest peak, in the northeastern part of the island, reaches 3609 feet. From this range of hills the



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land slopes north and south. Along the coast are stretches of nearly level low land, but the interior of the island is elevated and hilly.

The rivers are all short and rapid. While a few of them have estuaries which serve as harbors, none of them is navigable for any distance, though all are more or less valuable for water power. Those of importance flowing to the north coast are the Bayamon, the Loiza, the La Plata, the Manati and the Tanama. The Blanco flows to the western coast, and the Guayanes is the most important stream flowing to the south. There are numerous lagoons along the coast, and there are a few small lakes in the interior.

CLIMATE. Porto Rico is within the region of the northeast trade winds, which modify its temperature so that it does not suffer from the intense heat of some regions within the same latitude. The climate of the high land in the interior is also more salubrious than that along the coasts. The thermometer seldom rises above 100° in the hottest months or falls below 50° in the coldest. The mean annual temperature at San Juan is about 80°. The rainfall varies, averaging 60 inches at San Juan and 100 inches or more on the northeast coast. The north side of the island, because of the prevailing winds, receives more rain than the south

side, on which there are some localities where irrigation is occasionally necessary to the successful growing of crops.

MINERAL RESOURCES. Some lignite has been found, and for years gold has been found in small quantities along the beds of streams. There are also deposits of platinum, mercury, nickel, copper and iron, but none of these appears to be of sufficient value to warrant working. An excellent quality of marble is found in the island, and clay suitable for brick and tile is widely distributed. There are also valuable deposits of gypsum, which is used for plaster and fertilizer; on the southern coast phosphates exist in large quantities, and on Mona Island, off the west end of Porto Rico, as well as in several places along the neighboring coast, are valuable deposits of guano. These have not as yet been extensively worked.

AGRICULTURE. Agriculture is the chief occupation and engages the attention of considerably more than half the population. The most primitive methods of cultivation and the very rudest of implements, however, are in use, but American implements and methods are being gradually introduced. On the lowlands sugar cane is grown more extensively than any other crop, while coffee flourishes in the altitudes varying from 600 to 2000 feet. The third crop in importance is tobacco. This is followed by tropical fruits, which are rapidly gaining in quantity and the number of varieties, the chief fruits being oranges, bananas and pineapples. An upland variety of rice is grown and used for food.

MANUFACTURES. The manufactures are limited and are of comparatively little importance. Chief among these is the making of sugar. Of lesser magnitude are the manufacture of straw hats and other straw goods, the tanning of leather and the refining of petroleum. San Juan is the chief manufacturing center.

TRANSPORTATION. The island has few good roads; but a portion of the revenue is each year devoted to the construction of highways, and in time good highways will connect all the larger towns. There are about 130 miles of railway, which is a portion of a belt line designed to encircle the island. There are electric cars in San Juan and Ponce. San Juan on the north, the port of Ponce and Guánica on the south, Fajardo on the east and Mayaguez on the west, are the chief seaports. Regular lines of steamers ply between New York and the island, and also between Porto Rico and some of the ports of

England, Spain, South America, and other West India ports. The commerce is largely with the United States.

INHABITANTS. The population consists of Spaniards and other whites, who constitute about three-fifths of the inhabitants; negroes, and people of mixed Spanish and negro blood. There are also a few Chinese. Spanish is the prevailing language. The people live in rural communities, and there are no large cities on the island.

GOVERNMENT AND RELIGION. After its occupation by the United States a form of territorial government was organized in Porto Rico. The executive consists of a governor appointed by the president of the United States, with the advice and consent of the Senate, and an executive council of eleven members, appointed in the same manner. Five of these must be natives of Porto Rico. The legislature consists of this council, which is an upper chamber, and a house of delegates of 35 members, elected by popular vote for two years. For the purpose of election and local administration, the island is divided into seven districts. Other officers appointed by the president are a treasurer, an attorney-general and a commissioner of education. The old system of courts has been partially superseded by the American system. The island is given a representative at Washington, but he does not have a seat in Congress; neither are the citizens of Porto Rico citizens of the United States. Nearly all the inhabitants are Roman Catholics.

EDUCATION. A system of elementary schools on the American plan is in operation. These are under the immediate supervision of a commissioner of education. Schoolhouses are being erected, and native teachers are being trained as rapidly as funds for the work can be secured. A territorial university has been established by the government, and there is also a normal school for the training of teachers and a high school at San Juan. The Spanish language is generally taught, and most of the text-books are in this language, though English is being rapidly introduced. Considering the time since the occupation by the United States, the work of education has made remarkable progress.

HISTORY. Porto Rico was visited by Columbus on his second voyage in 1493 and was named San Juan Bautista. In 1508 Ponce de Leon landed on the island, and two years later he began its conquest. The Spaniards soon subdued and enslaved the natives, and within the

next few decades, under their rigorous rule, most of the natives died. Negroes were then imported for slaves. With the exception of a few decades during European wars, the island remained in peaceful possession of Spain, but its development was slow, owing to the colonial policy of that country. Several minor attempts at revolt were made, and one of these in 1867 caused some anxiety, but was speedily suppressed. Two years later Porto Rico was made a province of Spain and allowed representation in the national parliament. After eleven years, however, this favor was withdrawn. During the Spanish-American War the island was occupied by the United States forces under Admiral Sampson and General Miles on July 20, 1898. At the Treaty of Paris, Porto Rico was surrendered to the United States. Population in 1910, 1,118,012.

Port Republican, *por ra pū ble kaN°*. See PORT-AU-PRINCE.

Port Said, *sa eed'*, a city of Egypt, situated at the Mediterranean entrance of the Suez Canal. It has a large, deep harbor, which is well protected by piers and by a breakwater. The importance of the town rests in the fact that it is at the entrance of the canal, and because of this it has considerable shipping business. At the entrance of the harbor is a statue of Ferdinand De Lesseps, the engineer of the canal (See SUEZ CANAL). Population in 1907, 49,884.

Portsmouth, *ports'muth*, a seaport and the chief naval station of England; situated at the southwest extremity of Portsea Island, 65 mi. s. w. of London and 18 mi. s. e. of Southampton. The harbor is four miles long and nearly as wide and is large enough to accommodate the entire British navy. The town and harbor are protected by extensive fortifications, considered the best in Great Britain. The buildings and industries are comparatively unimportant. The city was the birthplace of Charles Dickens. Population in 1911, 231,141.

Portsmouth, N. H., one of the county-seats of Rockingham co., 58 mi. n. by e. of Boston, on the Boston & Maine railroad and on the Piscataqua River, 3 mi. from the Atlantic Ocean. It is the only seaport in the state and has a large, deep harbor and a considerable coasting trade. The industrial establishments include a large shoe factory, several breweries, marble works and manufactures of shoe buttons, button-sewing machines, locks and other goods. Portsmouth has a beautiful location, is of considerable his-

Portsmouth

torical interest and still contains several colonial mansions. The Isles of Shoals and many other places in the vicinity are popular summer resorts. The Portsmouth navy yard is on an island formerly known as Fernald's Island, now within the limits of the township of Kittery, Maine. The city has three parks, a public library and the Athenaeum, containing a museum and a large library. Other buildings of note are the old residences of governors Wentworth and Langdon, the Saint John's Church and the Federal building. The place was settled in 1623 and was known for many years as Strawberry Bank. It was incorporated as Portsmouth in 1653 and was chartered as a city in 1849. After the organization of New Hampshire in 1679, it was the capital of the state until 1807. The United States District Court of New Hampshire now holds its sessions alternately at Concord and Portsmouth. In the summer of 1905 the treaty which closed the Russo-Japanese War was negotiated here. Population in 1910, 11,269.

Portsmouth, OHIO, the county-seat of Scioto co., 100 mi. s. of Columbus, on the Ohio River, at the mouth of the Scioto and at the terminus of the Ohio Canal, and on the Baltimore & Ohio Southwestern, the Norfolk & Western and the Chesapeake & Ohio railroads. There are also several steamship lines on the river. The city is in a fertile agricultural region, with considerable mineral wealth, and it has become an important industrial center. It contains a public library, a hospital and several charitable homes. There are five attractive parks, and the Scioto valley contains interesting remains of the Mound Builders. The various manufactures include shoes, brick, stoves, cars, furniture, veneering, foundry and machine shop products, paper boxes and other articles. Population in 1910, 23,481.

Portsmouth, VA., the county-seat of Norfolk co., on the Elizabeth River, opposite Norfolk, with which it is connected by a ferry. It is on the Seaboard Air Line and the Southern railroads, while the other roads entering Norfolk also maintain connections here. The city is regularly laid out and is a popular residence place for Norfolk business men. It contains the United States navy yard, a naval hospital and a city park. There are also extensive cotton mills, railroad shops and other factories. There is a large trade in lumber, cotton, naval stores, fruits and vegetables. The place was settled in 1752 and was chartered as a city in

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1858. The Trinity Episcopal Church was first built in 1762 and is of historic interest. On the present site of the navy yard, the British government operated shipyards before the Revolution. Population in 1910, 33,190.

Port Townsend, the county-seat of Jefferson co., Wash., situated on the west coast of Puget Sound, near its junction with the strait of Juan de Fuca, 35 mi. n. w. of Seattle, and on the Port Townsend Southern railway. It occupies an important strategic position, and the harbor is strongly fortified. The industries include foundries, machine shops, boiler works, canneries, fisheries and a ship yard. The city was settled in 1851 and incorporated in 1860. Population in 1910, 4181.

Portugal, a republic situated in the extreme southwestern part of Europe. It lies between 37° and 42° north latitude and between 6° 15' and 9° 30' west longitude, and is bounded on the n. and e. by Spain and on the s. and w. by the Atlantic Ocean. Its greatest length from north to south is 350 miles, and its average width, about 100 miles. The area of Portugal proper is 34,254 sq. mi., or a little more than that of Maine. But with the Azores and Madeira islands, which are usually considered a part of the kingdom, the area is 35,490 sq. mi., making it a little larger than Indiana.

SURFACE AND DRAINAGE. Portugal is only partially separated from Spain by natural boundaries. Its shape is nearly that of a parallelogram. The coast line, of great length in proportion to the extent of the whole surface, runs in a general south-southwest direction till it reaches Cape Saint Vincent, where it suddenly turns east. The coast is occasionally bold and rises to a great height; but the far greater part is low and marshy, and is not infrequently lined by sands and reefs, which make navigation dangerous. The interior is generally mountainous, a number of ranges stretching across the country, forming a succession of independent river basins, while their ramifications form the watersheds of numerous tributary streams and enclose many beautiful valleys. The loftiest range is the Serra da Estrella, a continuation of the central chain stretching across Spain, which attains the height of 7524 feet.

CLIMATE. The climate is greatly modified by the proximity of the sea and the height of the mountains. In general the winter is short and mild, and in some places it never completely interrupts the course of vegetation. Early in February vegetation is in full vigor; during the

month of July the heat is often extreme, and the country assumes, particularly in its lower levels, a very parched appearance. The drought generally continues into September; then the rains begin, and a second spring unfolds. Winter begins at the end of November. In the mountainous districts the loftier summits obtain a covering of snow, which they retain for months; but south of the Douro, and at a moderate elevation, snow does not lie long. The mean annual temperature of Lisbon is about 56°.

MINERAL RESOURCES. The mountains contain large deposits of minerals, including lead, manganese, tin, zinc and antimony. Coal is mined at Cape Mondego and is also found in the vicinity of Leria. Salt is produced in large quantities, most of it being obtained from the sea. It is of excellent quality and is exported to various countries of Europe. But with this exception and the working of copper and coal mines to a limited extent, the mining industry is wholly undeveloped. What few mines there are are operated by foreigners, and the works are on a limited scale.

AGRICULTURE. The mild and equable climate adapts the country to agriculture, and almost any crop common to central and southern Europe can be grown successfully. Fruits are grown throughout the country, but the warmer districts in the south are noted for the production of oranges, lemons and olives. The mulberry is also cultivated on a large scale, but the cultivation of grapes and the manufacture of wines is the most important branch of the fruit industry. Notwithstanding the natural advantages, agriculture is in a deplorable condition, and in ordinary years the country fails to raise enough cereals to meet the demands of the population. Wheat, barley, oats, flax and hemp are cultivated on the higher land, while rice is grown on the lowlands. The raising of live stock is an important branch of agriculture, and a considerable number of horses, cattle, goats and swine are exported. The culture of the silk-worm is also important, and considerable raw silk is produced.

MANUFACTURES. The manufactures are comparatively unimportant. The leading centers are Oporto and Lisbon. The most important industries include shipbuilding and the manufacture of cotton and woolen goods, linen, silk, leather, spirits, porcelain, tobacco, hats, ironware, shoes and soap.

TRANSPORTATION. The large rivers which enter the country from Spain are navigable to

the Spanish border and greatly aid in the transportation of commodities. There are also numerous good harbors along the coast. The country has about 1500 miles of railroads, over one-third of which belong to the state. These lines connect all the important towns and also connect the leading cities with the commercial centers of Spain. The foreign trade is nearly all carried in English ships. The exports consist of wine, cork, copper ore, olive oil, fruits and live stock, while the imports include coal, raw cotton, fish and manufactured articles such as cannot be readily produced in the country. The foreign trade is chiefly with Great Britain, Germany, Brazil and the United States.

LITERATURE. The oldest monuments of Portuguese literature do not go back further than the twelfth and thirteenth centuries, and the native literature could then boast of nothing more than popular songs. The sixteenth century is the classic era of Portuguese literature. The chief names are Sá de Miranda, Gil Vicente and Camoes. The principal epic and the greatest poem in the Portuguese literature, almost the only one which has acquired a European reputation, is the *Os Lusíadas* of Camoes (See CAMOES, LUIS DE). The drama also began to be cultivated in the sixteenth century. Sá de Miranda studied and imitated Plautus; Ferreira composed the first regular tragedy, *Ines de Castro*, and Camoes wrote several theatrical pieces. By the opening of the seventeenth century Portugal's literary greatness had been succeeded by a period of little real power, though of great activity. During this period the native drama became almost extinct, being overshadowed by the Spanish. In the eighteenth century the influence of the French writers of the age of Louis XIV so completely dominated Portuguese literature that it became almost entirely imitative. Toward the close of this century two writers appeared who formed schools, Francisco Manoel do Nascimento (1734-1819), an elegant lyricist, and Barbosa du Bocage, who introduced an affected and hyperbolic style of writing. Among more recent poets there have been a number who possess some claim to originality, and through their efforts Portuguese literature has again begun to assume an aspect of native vigor. In art, Portugal has never distinguished herself.

GOVERNMENT AND RELIGION. Until October 5, 1910, the government has been a constitutional monarchy, the throne being hereditary. The king was irresponsible, all of his acts being

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signed by the ministers, who thereby assumed the responsibility of government. When the former king, Don Carlos I, and his eldest son were assassinated, February 1, 1908, the second son, Manuel II, became king, being only nineteen years of age. For centuries Portugal has been retrograding. The country is deeply in debt, and the young monarch confronted a situation which would have taxed the wisdom and skill of an able and experienced ruler. Under his regime, conditions gradually grew worse, and hatred of the ruling family increased. On October 5, 1910, a rebellion broke out. Most of the army and navy mutinied and joined the insurgents. The palace was bombarded, and Manuel was obliged to flee. A republic was organized with Theophile Braga as temporary president. Later the temporary government was made permanent, a decree of banishment was issued against the ruling family and the new government proceeded to conduct the affairs of state.

The Roman Catholic Church is the leading church, and nearly all of the inhabitants profess that faith. All other forms of worship are tolerated.

EDUCATION. In education the country is very backward. While there is a compulsory primary education law, it is not enforced, and only a small proportion of the children of the laboring classes attend school. Consequently, the percentage of illiteracy is very large, more than one-half of the people being unable to read and write. Secondary schools are maintained in the principal town of each district, and there are many private schools of similar grade, also institutions for giving industrial, commercial and technical training. The University of Coimbra, founded in 1290, is the leading educational institution.

INHABITANTS AND LANGUAGE. The people are rather short of stature, have dark complexion, with dark or black hair and dark eyes. The Portuguese sprung largely from the intermarriage of former native inhabitants with African and Brazilian negroes that were imported into the country centuries ago. There are many remains of ancient dwellings throughout the country, showing that Portugal was occupied by a civilized people as far back as the days of the Roman Empire. Without doubt many of these works were constructed by the ancient Romans. The language closely resembles the Spanish.

COLONIES. The foreign possessions of Portugal, situated in Africa and Asia, are as follows:

Portugal

COLONIAL POSSESSIONS	AREA IN ENGLISH SQ. MI.	ESTIMATED POPULATION
IN AFRICA:		
Cape Verde Islands.....	1,480	147,424
Guinea.....	13,940	820,000
Prince's and Saint Thomas's Islands.....	360	42,103
Angola.....	484,800	4,119,000
East Africa.....	293,400	3,120,000
IN ASIA:		
In India: Goa.....	1,469	475,513
Damao, Diu.....	169	56,285
Indian Archipelago.....	7,330	300,000
China: Macao, etc.....	4	63,991
Total.....	802,952	9,144,316

CITIES. The chief cities are Lisbon, the capital; Oporto, Setubal, Faro, Figueira and Vienna.

HISTORY. The Phoenicians, Carthaginians and Greeks early traded in this part of the peninsula, the original inhabitants of which are spoken of as Lusitanians, the country being called Lusitania. It was afterward conquered by the Romans, who introduced into it their own civilization. The country was later inundated by Suevi, Goths and Vandals, and in the eighth century it was conquered by the Saracens. When the Spaniards finally wrested the territory between the Minho and the Douro from Moorish hands (997), they placed counts, or governors, over this region. Henry of Burgundy, grandson of Hugh Capet, came into Spain about 1090, to seek his fortune in the wars against the Moors, and Alfonso VI of Leon gave him the hand of his daughter and appointed him count of Portugal. The count, who owed feudal services to the Castilian kings, was permitted to hold in his own right whatever conquests he should make from the Moors beyond the Tagus. Henry's son, Alfonso I (1128-1185), defeated the king of Castile and made himself independent, gained the brilliant victory of Ourique over the Moors and was saluted on the field as king of Portugal. The Cortes confirmed him in the royal title, and in 1181 gave to the kingdom a code of laws and a constitution. The succeeding reigns from Sancho I (1185-1211) to Denis (1279-1325) are noteworthy chiefly for the conflict with the pope, who several times put the kingdom under interdict. Denis's wise encouragement of commerce, agriculture, manufactures and navigation laid the foundation of the future greatness of Portugal.

Denis was succeeded by Alfonso IV, who in turn was succeeded by his son Pedro. Dying in 1367, Pedro I was succeeded by Ferdinand,

on whose death in 1383 the male line of the Burgundian princes became extinct. John I, the natural son of Pedro, was saluted king by the estates, and he proved an excellent sovereign. In 1415 he took Ceuta, on the African coast, and this was the first of a series of enterprises which resulted in those great expeditions of discovery on which the renown of Portugal rests. The reigns of his son Edward (1433-1438) and his grandson Alfonso V (1438-1481) were less brilliant than that of John I; but the latter was almost surpassed by that of John II (1481-1495), perhaps the ablest of Portugal's rulers. In his reign began a violent struggle with the nobility, whose power had become very great under his indulgent predecessors. The expeditions of discovery were continued; Bartholomeu Diaz doubled the Cape of Good Hope, Vasco da Gama reached India, and Brazil was taken possession of for Portugal by Cabral.

While these great events were still in progress, John II was succeeded by his cousin Emmanuel (1495-1521), under whom the power of Portugal reached its height. In the reign of John III, son of Emmanuel (1521-1557), Indian discoveries and commerce were still further extended; but the rapid accumulation of wealth, through the importation of the precious metals and the monopoly of the commerce between Europe and India, proved disadvantageous to home industry. The wisdom which had hitherto so largely guided the counsels of the kings of Portugal now seemed to forsake them. The Inquisition was introduced, and the Jews, who were among the wealthiest and most industrious citizens of the country, were driven out. Sebastian, the grandson of John III, lost his life in a battle against the Moors and left his throne to the disputes of rival candidates, of whom the most powerful, Philip II of Spain, obtained possession of the kingdom by the victory of Alcantara. The Spanish yoke was grievous to the Portuguese, and many efforts were made to throw it off; but the power of Philip was too great to be shaken. In 1640, by a successful revolt of the nobles, Portugal recovered her independence, and John IV, duke of Braganza, reigned till 1656, when he was succeeded by Alfonso VI. Pedro II, who deposed Alfonso VI, concluded a treaty with Spain (1668), by which the independence of the country was acknowledged.

During the long reign of John V (1706-1750) some vigor was exerted in regard to foreign relations, while under his son and successor,

Joseph I (1750-1777), the Marquis of Pombal, a vigorous reformer such as Portugal required, administered the government. On the accession of Maria, eldest daughter of Joseph, in 1777, the power was in the hands of an ignorant nobility and a not less ignorant clergy. In 1792, on account of the sickness of the queen, John, the crown prince, was declared regent. His connection with England involved him in war with Napoleon; Portugal was occupied by a French force under Junot, and the royal family fled to Brazil.

In 1808 a British force was landed under Wellington, and after some hard fighting the decisive Battle of Vimeira took place, which was followed by the Convention of Cintra and the evacuation of the country by the French (See PENINSULAR WAR). The French soon returned, however; but the operations of Wellington, and in particular the strength of his position within the lines of Torres Vedras, forced them to retire. The Portuguese now took an active part in the war for Spanish independence. On the death of Maria in 1816, John VI ascended the throne of Portugal and Brazil, in which latter country he still continued to reside. The absence of the court was viewed with disfavor by the nation, and the general feeling required some fundamental changes in the government. A revolution in favor of constitutional government was effected without bloodshed in 1820, and the king was invited to return home, which he now did. In 1822 Brazil threw off the yoke of Portugal, and proclaimed Dom Pedro, son of John VI, emperor. On the death of John, the Brazilian emperor Pedro became king of Portugal, and he granted a new constitution, modeled on the French, in 1826. In this year he abdicated the Portuguese throne in favor of his daughter Maria da Gloria, imposing on her the condition of marrying her uncle Dom Miguel, who was intrusted with the government as regent; but the absolutist party in Portugal set up the claim of Dom Miguel to an unlimited sovereignty, and a revolution in his favor placed him on the throne. In 1831 Dom Pedro resigned the Brazilian crown, and returning to Europe he succeeded in overthrowing Dom Miguel and restoring the crown to Maria, but died himself in 1834. In 1836 a successful revolution took place in favor of the restoration of the constitution of 1820, and in 1842 another in favor of that of 1826. Maria died in 1853. Her husband, Ferdinand of Coburg, became regent for his

son, Pedro V, who began to reign in 1855. Pedro died in 1861 and was succeeded by his son, Carlos I, who, with the crown prince, was assassinated February 1, 1908. The second son, Manuel II, reigned until 1910, when he was deposed and a republic established. In 1914 Portugal, as an ally of Great Britain, declared war against Germany, and sent troops to southern Africa to attack the German colonies there. Population in 1911, 5,957,985.

Portuguese, *por'tu geez*, **East Africa** or **Mozambique**, a Portuguese colony extending from German East Africa, on the north, to the Transvaal on the south. The western boundary is formed by British Central Africa, Rhodesia and the Transvaal. The region is crossed by the Zambezi River, which divides it into two nearly equal sections. The area is 301,000 square miles. Most of the surface is low and swampy along the coast and rises to a higher level in the interior, which is covered with forests. The Namuli Mountains, with an altitude of 7500 feet, and the Serra da Gorongaza are the highest elevations. Most of the region has an unhealthy climate for Europeans. The native inhabitants are Bantus, and they are generally engaged in agriculture, raising large crops of corn, tobacco, palm nuts, rubber, indigo, coffee and sugar. Some gold and coal are obtained. Laurenço Marquez, the capital, is connected with Pretoria by railway, and in all there are about 300 miles of railway in the colony. The other important towns are Mozambique, Quilimane, Sofala and Beira. Population, estimated at 3,120,000.

Portuguese Guinea, *gin'e*, a small Portuguese colony on the western coast of Africa, off Senegambia. It includes a small coast territory and the Bissagos Islands. The area is 14,300 square miles. The capital is Bulama. Population, estimated at 200,000.

Port Wine, a very strong, full-flavored wine, produced in the upper valley of the Douro, Portugal; it takes its name from Oporto, the place of shipment. It is slightly astringent and has a color varying from pink to red. It requires three or four years to mature, and with age it becomes tawny; it receives a certain proportion of spirit, to hasten the process of preparation. The largest quantity exported goes to England. The name *port* is also applied to a wine of similar color and flavor manufactured in California. See **WINE**.

Posen, *po'zen*, a fortified town of Prussia, capital of the Province of Posen, on the Warthe

River, 190 mi. n. of Breslau. It is surrounded by two lines of forts, is built with considerable regularity and has, in general, fine wide streets and numerous squares, or open spaces. The most noteworthy public buildings are the Gothic cathedral, built in the eighteenth century; the parish church; the Church of Saint Mary; the Raczynski palace, which contains a large library; the townhall, and the royal palace. The manufactures of the city consist chiefly of cigars, furniture, machinery, distilled liquors and flour. Posen is one of the oldest cities of Poland and was the capital of some of the early Polish kings. Population in 1910, 156,691.

Positivism, *poz'i tiv iz'm*, or **Positive Philosophy**. See **COMTE**, AUGUSTE.

Postal Savings Banks. See **SAVINGS BANKS**.

Postmaster-General. See **POSTOFFICE**.

Postoffice, a department of the government of a country, charged with the conveyance of letters, newspapers and parcels. From the earliest times governments have carried on systems of postal communication, but the "post" as we know it to-day is an institution of very modern growth. The beginnings of a postal service in the United States date from 1639, when a house in Boston was employed for the receipt and delivery of letters for or from beyond the seas. In 1672 the government of New York colony established "a post to goe monthly from New York to Boston"; a general post-office was established in Virginia in 1692, and in Philadelphia in 1693. A deputy postmaster-general for America was appointed in 1692; at about the same time, a monopoly was established, which included, also, the transport of travelers, and a tariff was fixed. The system, however, proved a failure until 1753, when Benjamin Franklin became postmaster-general; when he was removed from office in 1774 the net revenue exceeded \$15,000.

In 1789, when the postoffice department was transferred to the new Federal government, the number of offices in the thirteen states was only about seventy-five. The remarkable progress in the ensuing century is shown in the table below. Important events in the history of the American postal service have been the negotiation of a postal treaty with England (1846); the introduction of postage stamps (1847); of stamped envelopes (1852); of the system of registering letters (1855); the establishment of the free delivery system and of the traveling postoffice system (1863); the introduction of

the money order system (1864); the introduction of postal cards (1873); stamped newspaper wrappers and envelopes bearing requests for the return of the enclosed letter to the writer, in case of non-delivery; the formation of the Universal Postal Union (1873); the issue of "postal money orders" (1883); the establishment of a special delivery system (1885), under which letters bearing an extra ten-cent stamp are delivered by special messengers immediately on arrival, and the beginning of the rural free delivery system (1896), by which mail is delivered to rural homes by carrier regularly and without extra charge. The number of rural free delivery routes exceeds 16,000, and more are being opened each year.

The postmaster-general is a member of the cabinet. Under him about 100,000 persons are employed, of whom some 76,000 are postmasters. Most of these, except letter-carriers and clerks, are liable to be removed on the accession to Federal office of a new political party. The following table shows the increase, by decades:

YEARS	OFFICES	MILES	REVENUE	EXPENDITURE
1790...	75	1,875	\$37,935	\$32,140
1800...	903	20,817	280,804	213,994
1810...	2,300	36,406	552,366	495,969
1820...	4,500	72,492	1,111,927	1,160,926
1830...	8,450	115,176	1,850,583	1,932,708
1840...	13,468	155,739	4,543,522	4,718,236
1850...	18,417	178,672	5,552,971	5,212,953
1860...	28,498	240,954	8,518,067	19,170,610
1870...	28,492	231,232	19,772,221	23,998,837
1880...	42,989	343,888	33,315,479	36,542,804
1890...	62,401		60,858,783	66,645,083
1900...	76,688	500,982	102,354,579	107,740,268
1905...	68,131	486,805	152,826,585	167,399,169
1910...	59,580	447,998	224,128,657	229,977,224

The number of postoffices in the United States is one-half larger than that in any other country. It provides a postoffice to every 1,003 persons.

All mail matter is divided into four classes. The first includes letters, postal cards and anything closed against inspection; postage, 2 cents each ounce or additional fraction of an ounce; postal cards, 1 cent; registered letters, 10 cents in addition to postage. Second-class matter includes all newspapers or periodicals issued as frequently as four times a year; postage, 1 cent per pound or fraction thereof. When the newspapers are sent by persons other than the publishers, the charge is 1 cent for each four ounces. Mail matter of the third class includes books, circulars or proof sheets; postage, 1 cent for each 2 ounces; limit of weight, 4 pounds to each package. The fourth class embraces

merchandise and all matter not included in the other three classes; this class is now known as the parcel post. In general, prepayment of postage by stamps for all classes of matter is required, but parcel post matter may be sent collect-on-delivery, and by a rule which took effect in 1914, letters which are accidentally mailed without postage may be collected for on delivery. See PARCEL POST.

Larceny in relation to the postoffice is punished with great severity. Every person employed under the postoffice who wrongfully opens or detains a letter, or is accessory thereto, is liable to be punished by fine or imprisonment, or by both. If he embezzle, secrete or destroy a letter, he is guilty of felony.

Pot' ash, an alkaline substance obtained from the lye of vegetable ashes. It derives its name from the *ashes* and the *pots* (called *potash kettles*) in which the lye was boiled down. An old name was *vegetable alkali*. Potash in this crude state is an impure carbonate of potassium, which, when purified, is known to commerce as *pearl ash*. It is used in the making of glass and in the making of soap.

Potas'sium, a name given to one of the elements, the metallic basis of potash, discovered by Davy in 1807, constituting one of the first fruits of his electro-chemical researches. Next to lithium it is the lightest metallic substance known. At ordinary temperatures it may be cut with a knife and worked with the fingers. At 32° it is hard and brittle, with a crystalline texture; at 50° it becomes malleable, and in luster it resembles polished silver; at 150° it is perfectly liquid. Potassium has a very powerful affinity for oxygen, which it takes from many other compounds. A freshly-exposed surface of potassium instantly becomes covered with a film of oxide. The metal must therefore be preserved under a liquid free from oxygen, petroleum or naphtha being generally employed. When thrown upon water it decomposes that liquid with evolution of hydrogen, which burns with a pale violet flame, owing to the presence in it of potash vapor. *Chloride of potassium* is known in commerce as "muriate of potash," and it closely resembles common salt. It is obtained from potassic minerals, from the ashes of marine plants and from sea water or brine springs. It enters into the manufacture of saltpetre, alum and artificial manures. *Potassium bromide* appears in the form of white, cubic crystals that have a strong, salty taste. Photographers use it extensively, and it is frequently prescribed in medicine for

its quieting influence. *Potassium bicromate* is an important chemical that is used in the preparation of colors and in photo-engraving processes. *Potassium cyanide*, a white crystalline substance, is deadly poison, but it is used to some extent in the arts. Besides these salts, there are a number of other potassium compounds which are of considerable importance. See SALTPETRE; WATER GLASS.

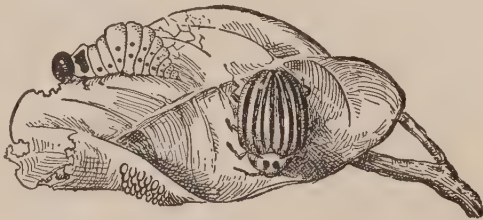
Pota'to, a food plant, belonging to the same family as the nightshade, thorn apple and tobacco. The potato was discovered by the Spaniards after the conquest of Peru, early in the sixteenth century, and by them it was taken to Europe, where it soon spread over the Netherlands, Burgundy and Italy. The plant is highly prized for the tubers, which are fleshy, underground stems, containing a large proportion of starch. As it was found in the wild state, the potato was small and of little value, but the numerous varieties now in general cultivation have been obtained by improving the original species. The value of this plant for food can scarcely be overestimated. At the time of its discovery many countries of Europe were overcrowded and suffering frequent famines, from the failure of their grain crops. Since the potato would thrive in soils where grain could not profitably be raised, it added an important source of food to these countries.

The top or stem is nearly square; it branches frequently, and it grows to the length of from two to four feet, according to the richness of the soil. The blossoms are about three-fourths of an inch in diameter and are white, bluish or pink. The fruit proper is a spherical berry, about the size of a cherry. When ripe it is reddish-brown or purplish and contains a large number of small seeds, but the plant is propagated by planting the tubers, from the eyes of which new plants spring. Varieties are produced from the seeds, but the seed seldom reproduces a variety like that from which it sprang.

Besides its extensive use as an article of food, the potato is used as feed for stock and for the manufacture of starch. Tubers of the best quality are obtained in cool temperate climates, where soil and moisture are favorable to their growth. In the United States, New York is the leading producer, with an average yearly crop of nearly 50,000,000 bushels. Michigan ranks second, with an annual average of about 40,000,000, and is followed in order by Wisconsin, Maine, Minnesota, Ohio, Pennsylvania and Iowa. The total crop for the country is about 400,000,000

bushels a year. Canada produces about 80,000,000 bushels a year, of which Ontario and Quebec each yield about one-fourth.

Potato Bug or Colorado Beetle, a small beetle of yellow color, with ten black stripes lengthwise of its wings. It is a native of the Rocky Mountains, where it lived, until the country was settled, upon the small wild potato plant. When the cultivation of potatoes was begun in the West, the beetles thrived and multiplied in astonishing numbers, and by 1875 they had spread all over the United States and Canada. The beetles lay their orange-colored eggs on the



POTATO BUG, YOUNG AND EGGS

lower sides of the leaves of the new plants. In about a week these hatch into reddish slugs, which feed hungrily upon the leaves and grow rapidly, fading in color and developing two rows of black spots along the sides. When they have reached maturity they crawl into the ground and soon are changed into full-grown beetles. Spraying with preparations of Paris green will protect the plants, though if the beetles are numerous the plants must be constantly tended.

Poto'mac, a river of the United States, which forms the boundary between Maryland and Virginia, passes Washington, D. C., and after a course of about 450 miles falls into Chesapeake Bay. It is about 8 miles in width at its mouth. The termination of the tide water is at Washington, about 125 miles from the sea, and the river is navigable for large ships to that point. Above Washington there are several falls.

Pots'dam, a city of Prussia, capital of the Province of Brandenburg and the second royal residence of the kingdom. It is beautifully situated in the midst of wooded hills, 17 mi. s. w. of Berlin, on the Havel. The principal buildings are the royal palace, Garrison Church, a French Protestant church, the town house, the Church of Saint Nicholas and the Barberini Palace. The palace of Sans Souci, in the vicinity of the city, was erected by Frederick the Great. In the neighborhood are the New Palace and Marble Palace. It manufactures optical instruments, sugar and beer. Population in 1910, 62,243.

Pottawatomi, *pot ta wahl'o my* (fire makers), an Algonquin tribe, first met by the whites near Green Bay, Wis. They subsequently moved south and settled on former Miami territory, where Chicago now stands. After the Illinois were driven out, the Pottawatomi occupied the greater portion of what is now the State of Illinois and the southern part of Michigan and northern Indiana.

Potter, HENRY CODMAN (1835-1908), Protestant Episcopal bishop of New York, born in Schenectady. He entered the ministry in 1858. In 1868 he became rector of Grace Church, New York. He was consecrated bishop in 1887. Among his works are *The Citizen in Relation to the Industrial Situation*, *The Drink Problem in Modern Life* and *The East of Today and Tomorrow*.

Pot'tery, vessels or utensils made out of clay and hardened by firing. The art of making such ware is known as ceramic art.

Pottery is made of various grades of clay, to which sometimes a small proportion of fine sand, powdered feldspar or flint is added, the kind and proportion of these ingredients determining the sort of ware. Clays that contain any appreciable quantity of iron turn red when burned, as in the making of brick, and much of the coarsest grade of earthenware is made of this kind of clay. Other varieties turn to a cream color, and others become a reddish-brown. The finest quality of clay used for pottery is known as *kaolin* and is pure white. Some varieties of clay contain enough sand to make the glaze or enamel, but for most wares this has to be added. The glaze is made by different substances for different wares. That of stoneware, such as common jugs and crocks, is made by throwing common salt into the furnace, where it is decomposed and fuses with the clay. Other varieties of stoneware are glazed by a mixture of white lead, flint and glass ground together, while porcelain is glazed by a still different composition.

MANUFACTURE. The first step in making pottery is to grind the clay to a very fine powder, which is mixed with water into a dough-like mass. In the manufacture of ordinary stoneware, a quantity of this dough sufficient for the vessel is attached to a horizontal wheel called the *potter's wheel*, which is worked by foot power. The workman forms the clay into a cone with a blunt apex; then, by inserting his thumbs into the apex of the cone and revolving the wheel, he roughly shapes the vessel with his hand. After this the walls are pared and smoothed inside and out, by

tools of wood or leather. During the working, the clay, tools and hands of the workmen are kept moist. When shaped, the vessel is placed in the drying room, where it is allowed to harden, after which it is ready for burning.

Vessels that are not round are usually cast in molds, made of plaster of Paris, each half of the vessel being made separately and the parts joined together when taken from the molds.

Pottery is burned, baked or fired in kilns, which vary in size and shape according to the sort of ware for which they are designed. The higher grades of ware are placed in cylindrical earthen boxes, called *saggers*. The saggers are stacked in the kiln by packing in tiers, one above the other. The ware is usually raised to a white heat, which is maintained for thirty-six hours or more, after which the kiln is allowed to cool slowly. When cold, the ware is taken from the saggers, and in this state it is called *biscuit*. The rough places on the surface are now smoothed, and other finishing touches are given, after which the ware is glazed. This is done by dipping it in a mixture called the *slip*. This is a solution of the glazing substance in water and is but little thicker than milk. The ware is dipped in, and on being removed it is so handled that no drops are left standing on the surface. The porous walls absorb the water and leave a thin coating on the surface, which, on a second firing, passes into the clay and forms the glaze. By the addition of necessary pigments, coloring can also be produced with the glaze. When this is poured on and allowed to run down until stopped by the heat, beautifully shaded effects are often produced. Different colors on the same article are produced by using different glazes. Decorations are usually put on with a brush, either before or after glazing. If decorated after glazing, the ware must be fired a third time. Decorating requires great care and skill, since the colors, when put on, are entirely different from those which will appear after firing. For instance, gold is put on in the form of a chloride which has a brown color.

VARIETIES. There are many varieties of pottery. Among the most common are the following:

Earthenware, which includes all of the coarser grades of ware, from the ordinary stoneware, of which jugs and crocks are made, to the heavier grades of ware used for culinary and table purposes. Earthenware is undoubtedly the earliest form of pottery, and rude articles are found among all uncivilized peoples.



PRIZE WINNERS AT THE NATIONAL POULTRY SHOW, CHICAGO, ILLINOIS

- | | |
|----------------------------------|------------------------------------|
| 1. White Leghorn Cock. | 5. White Plymouth Rock Cock. |
| 2. Buff Leghorn Cock. | 6. Barred Plymouth Rock Cock. |
| 3. Wyandotte Pullet. | 7. Black Orpington Cock. |
| 4. White Rose Comb Minorca Cock. | 8. Rose Comb Rhode Island Red Hen. |

Stoneware is a high grade of earthenware, and the term is often applied to numerous varieties of ware in most common use. It is hard, well enameled and often beautifully decorated.

Chinaware, or *porcelain*, is the finest grade of pottery. It is made by mixing the best quality of kaolin with a Chinese clay containing a little silica. When fused at a high temperature, these ingredients produce a beautiful translucent ware. Porcelain originated with the Chinese, hence the name china, or chinaware. It is known to have been manufactured as early as 950 B. C., and the Chinese people still show the greatest skill in its manufacture. From China and Japan come the most delicate and beautiful specimens of this ware. The manufacture of china was introduced into Europe early in the sixteenth century, and numerous establishments now exist both on the Continent and in England. The oldest and best known of these is near Dresden, Saxony, and from this city the ware has taken its name. *Dresden china* has attained wide popularity and is prized for its excellent quality and beautiful finish.

Pottery making is one of the oldest of the arts and has been practiced by primitive people as well as by civilized nations. Works found in Egypt and Babylonia and in the buried cities of Asia Minor and Greece attest the artistic skill which these peoples attained in their manufacture of pottery ware. See FAIENCE; DELFT; MAJOLICA; TERRA COTTA; WEDGWOOD WARE.

Potts'town, PA., a borough in Montgomery co., 35 mi. n. w. of Philadelphia, on the Schuylkill River and on the Pennsylvania and the Philadelphia & Reading railroads. It is in an agricultural region and contains rolling mills, blast furnaces, steel mills, bridge works, creameries, and manufactories of nails, agricultural implements, cigars and other articles. The borough has a public high school, a school library, a business college and the Hill School, a private institution for boys. The place was laid out in 1752 and was called Pottsgrove until its incorporation as a borough in 1815. Population in 1910, 15,599.

Potts'ville, PA., the county-seat of Schuylkill co., 35 mi. n. w. of Reading, on the Schuylkill River and on the Philadelphia & Reading, the Pennsylvania, the Lehigh Valley and other railroads. It is in a picturesque region and is visited by many tourists. The borough is surrounded by anthracite coal fields and is principally engaged in mining. It was here that

anthracite coal was first used successfully for smelting iron ore. There are railroad shops, a large steel plant, and manufactories of plush, velvet, machinery, textiles and other goods. The borough has a hospital, a county courthouse, a jail, the Commercial Union School and the Pottsville Athenaeum, which contains a library. The place was settled about 1800, was laid out as a town by John Pott in 1816, was incorporated as a borough in 1828 and was made a city in 1851. Population in 1910, 20,236.

Poughkeepsie, N. Y., the county-seat of Dutchess co., 74 mi. n. of New York City, on the east bank of the Hudson River and on the New York Central, the New York, New Haven & Hartford and other railroads. A ferry connects with the West Shore railroad, and electric railways extend to several neighboring places. The city is built on an elevation about 200 feet above the river. It is the seat of Vassar College, several secondary schools and a business college; it also has the Adriance Library, a state hospital for the insane, Saint Barnabas Hospital and several other charitable institutions. College Hill Park contains 100 acres. A cantilever bridge, 7100 feet long, which here spans the Hudson, is of interest. The important industries of the city include machine works, foundries, machine shops, a shoe factory, packing houses, lumber mills and the manufacturing of patent medicines, cigars and cigarettes and other articles. The place was settled by the Dutch in 1698, on the site of an Indian village called *Apokeepsing*, meaning *safe harbor*. During the Revolution, after 1778, it was the capital of the state; and the convention which ratified the Federal Constitution met here. It was made a village in 1799 and was chartered as a city in 1854. Population in 1910, 27,936.

Poultry, *pole'try*, a general name for all birds bred for the table or kept for their eggs. The birds most commonly included under this designation are the common fowl, the pea fowl, the guinea fowl, the turkey, the goose and the duck. There is this great difference between the varieties of the domestic fowl: some are disposed by constitution to continue laying throughout the whole season, without sitting; while others, after having laid from twelve to fifteen eggs, sit obstinately and cease to lay. Among the breeds most in favor are those known as Dorking, Game, Hamburg, Cochin, Brahma, Polish, Spanish and Plymouth Rock. Poultry should have a spacious house, with a

yard and shed attached. The house should be moderately warm, well lighted and perfectly dry. Poultry raising in the United States has become an important industry, and the entire income exceeds the income from the wheat crop. See DUCK; FOWL; GOOSE; TURKEY.

Pound, a weight of two different denominations, *avoirdupois* and *troy*. The pound *troy* contains 5760 grains, and is divided into 12 ounces; the pound *avoirdupois* contains 7000 grains, and is divided into 16 ounces. The *pound*, or *pound sterling*, the highest monetary denomination used in British money accounts, and equal to 20 shillings, is so called from originally being equal to a quantity of silver weighing one pound. It is strictly a money of account, the coin representing it being the sovereign. It is equivalent to \$4.8665; to 25.175 French francs, Italian lira or Spanish pesetas; to 20.412 German marks; to 9.43 Russian rubles and to 18.0278 Danish, Swedish or Norwegian crowns.

Pound'al, the unit employed in measuring force in the English system of weights and measures. It is such a force as, applied to one pound of mass for one second of time, will produce a velocity of one foot per second. See DYNAMICS.

Poussin, *poo saN'*, NICOLAS (1594-1665), a distinguished French historical and landscape painter, born at Andelys, in Normandy. He was very poor in his youth and was unable to go to Rome to study until he was thirty. After this he found liberal patrons in Cardinal Barberini and in the Cavaliere Cassiano del Pozzo, for whom he painted the celebrated *Seven Sacraments*, now at Belvoir Castle. He was also invited to paint the great gallery of the Louvre, and his successes gained him the position of first painter to Louis XIII, with a pension of 3000 livres. From 1640 to 1642 he lived in Paris, but the rivalry of French painters and the want of appreciation of his works by the Parisians induced him to return to Rome, where he lived until his death.

Powder. See GUNPOWDER.

Pow'derly, TERENCE VINCENT (1849-), an American lawyer and administrator, born in Pennsylvania. He began life as a switchman and early in life was identified with various labor organizations. He was elected mayor of Scranton, Pa., in 1878 and was reelected in 1880 and 1882. In 1879 he was elected general master workman of the Knights of Labor, and held the position until 1893. He was admitted

to the bar in the following year. He was commissioner-general of immigration from 1897 to 1902, and in 1907 became chief of a division in the immigration bureau.

Pow'ell, JOHN WESLEY (1834-1902), an American geologist, born in Mount Morris, N. Y., and educated in Illinois College, Jacksonville, and at Oberlin College, Ohio. In the Civil War he rose to be lieutenant colonel, and at the close of the war he became professor of geology in the Illinois Wesleyan University at Bloomington and later in the Illinois Normal University. In 1867 and years following, under direction of the Smithsonian Institution and the department of the interior, he conducted the geographical and geological survey of the Rocky Mountain region and was the first to explore the canyons of the Colorado. His *Contributions to North American Ethnology*, the results of his work, gained him recognition in the scientific world. In 1881 he was appointed director of the United States Geological Survey. His publications include many scientific papers and addresses and numerous government volumes. He was president of the Anthropological Society of Washington and of the American Association for the Advancement of Science.

Power, in mathematics, the product obtained by using a number as a factor two or more times. The product of a number multiplied by itself is the second power, or square of that number; the product obtained by taking a number three times as a factor is the third power, or the cube of the number; four times, the fourth power, and so on. For example, $4 \times 4 = 16$; 16 is the square of 4; $4 \times 4 \times 4 = 64 = 4^3$; 64 is the cube of 4. The figure denoting the power to which a given number is to be raised is placed at the right and above the given number and is known as the *exponent*. The process of finding a power of a number is called *involution*.

Power of Attorney. See AGENT.

Powers, HIRAM (1805-1873), an American sculptor, the son of a farmer, born at Woodstock, Vt. As a boy he was first employed in a clock factory in Ohio, whither his family had moved, and later he obtained employment in a museum in Cincinnati, remodeling and repairing wax figures. At this period he formed the acquaintance of a German sculptor, and having been taught modeling by him, he determined to become a sculptor. In 1835 he went to Washington and had sufficient success there to enable him to proceed to Italy. He now settled in Florence, where he resided until his

death. His first work in Italy was *Eve Tempted*, followed by the *Greek Slave*, which is his best-known work and is considered the first important American work of ideal conception. Among his other works are *Fisher Boy*, *Proserpine* and busts of Franklin, Jefferson, Washington, Webster, Calhoun, Everett and Sheridan, as well as other eminent Americans.

Powers, THE GREAT, a term of modern diplomacy, used to designate the most powerful nations of the world, now including Great Britain, France, Austria, Germany, Italy, the United States, Russia and Japan.

Powhatan' (1550-1618), an indian chieftain, whose real name was Wahunsonacook, Powhatan being the name of the tribe of which he was ruler. His seat was in Virginia, and he had frequent intercourse with the Jamestown colonists. He at one time held Captain John Smith as prisoner and, it is said, was about to take his life, when Smith was spared through the plea of Pocahontas, the chief's daughter.

Pozzuoli, *pot soo o'le*, a city of Italy, situated on a branch of the Bay of Naples, 7 mi. s. w. of Naples. In ancient times it was one of the most important commercial centers of Italy and was also the residence of many wealthy Romans. Remains of its ancient architecture attest its former grandeur. Among these are an amphitheater, baths and the Temple of Serapis. Population in 1911, 19,000.

Praetor, *pre'tor*, an important magistrate in the ancient Roman State. Up to 367 B. C. the title was borne by the consuls, but, when at that date the consulship was thrown open to the plebeians, the judicial functions of the consul were separated from his other duties and given to a new patrician magistrate, who was called the praetor. In 337 B. C., after a struggle, the plebeians were admitted to this office also. In 246 B. C. another magistracy, that of *praetor peregrinus* (foreign praetor), was instituted for the purpose of settling disputes between foreigners and between foreigners and citizens; and in distinction the other magistrate was termed *praetor urbanus*. After election the two praetors determined their offices by lot. The *praetor urbanus* was first in position and was the chief magistrate for the administration of justice. About 227 B. C. the number of praetors was increased to four and afterward to six and then eight; under the Empire the number varied from twelve to eighteen. After completing his year of office the praetor was often sent as *propraetor* to govern a province.

Praetorian Guard, the personal guard of the Roman emperors. Augustus was the first to make of the bodyguard of the commander in chief of the Roman army a regular, permanent force. Under him it consisted of nine cohorts, three of which were kept in Rome and the remainder in the neighborhood of the city. Under the later emperors the praetorians were increased in numbers and given greater importance. In time they gained the chief power in the State and were able to appoint, depose or murder emperors at their will. It was only by bribery of the praetorian guard that a man could secure the imperial dignity or could maintain it after he had secured it. Constantine abolished the institution in 312.

Pragmatic Sanction, the name given, originally in the Byzantine Empire, to any important decree regarding affairs of state. The most important pragmatic sanction in the history of Europe was that issued by Charles VI, Holy Roman emperor, settling the succession to the throne on his daughter, Maria Theresa. See CHARLES VI; MARIA THERESA.

Prague, *pragg*, the second city of Austria-Hungary and capital of the Department of Bohemia, is situated on the Moldau River, 160 mi. n. w. of Vienna and 75 mi. s. e. of Dresden, with both of which it is connected by railway. The city is built upon both sides of the river, which is crossed by nine bridges. The site is upon low hills, which rise gradually from the river. The city comprises seven districts. On the east are the districts of Altstadt, Josephstadt, Neustadt and Wischehrad, the newest part of the city; while on the west are the districts of Kleinseite, Hradschin and Holeschowitz-Bubna, which is the industrial part of the city. The Altstadt and Neustadt districts are the most important commercially.

The most interesting part of the city is in the Altstadt. Here, clustered about Grosser Ring, or the principal square, are the Teynkirche, or the old Hussite Church; the Kinsky Palace; the townhall; the Kreuzherrenkirche, constructed after the plan of Saint Peter's at Rome; the Palace of Clan Gallas, the former palace of the Bohemian kings, and the Rudolphinum, a structure containing the conservatory of music, a museum of industrial arts and a picture gallery. Near by are the old university buildings, some of which date from the Middle Ages. In the Cathedral of Saint Viet, in the district of Hradschin, is the marble tomb of the Bohemian kings. The modern buildings include the Bohemian National

Theater, the German Theater and the Bohemian National Museum. The city also contains a number of monuments and statues. The leading educational institution is the University of Prague, which dates from the Middle Ages (See PRAGUE, UNIVERSITY OF). The other educational institutions include the Royal German and Royal Bohemian Polytechnic institutes, a school of art and a conservatory of music. The city also is the home of several distinguished learned societies.

Prague is the second largest industrial city of Austria-Hungary. Most of the manufactories are located in the suburbs. The leading industries include the manufacture of engines, machinery, leather, railway cars, chemicals, spirituous liquors, carriages, furniture, gloves, cotton goods and underwear. There are a number of breweries and flouring mills, and the printing and publishing business is of considerable importance. Population in 1910, 223,741, about seven-eighths of whom are Bohemian.

Prague, UNIVERSITY OF, a name given to two universities situated in the city of Prague, one German and the other Bohemian. The original University of Prague is the oldest German university. It was founded in the middle of the fourteenth century, but was based on a school that originated about one hundred years before. During the Middle Ages it suffered many changes and reverses, because of the religious conflicts by which it was disturbed. In 1419 the Catholics were expelled from the institution, and as a result the university lost much of its property and a large number of students. In the latter part of the fifteenth century a number of colleges were founded, and the university again began to prosper. In the middle of the seventeenth century it became a Jesuit college. The Czech movement of the nineteenth century resulted, at first, in an increase of attendance, but finally in the organization of the Czech University of Prague. In 1882 and 1883 the faculties of law, medicine and arts were established, to which some years later the faculty of theology was added. This gave the Bohemian university a prestige which has enabled it to far outgrow the German university. In 1911 the Czech University had an attendance of 4400, while that of the German University was only 1965.

Prairie, the name given to the vast natural meadows or plains of the Mississippi basin, especially that portion lying between the river and the Rocky Mountains and extending northward into central Canada. Throughout this immense

territory the differences of level are sufficient to produce a steady flow of the rivers, but not so great as to obstruct their navigation, thus securing a unique system of easy intercommunication by water between all sections of the country. There is a sameness in the features of the surface, the vegetable productions, the soil and the geological features. Some of the prairies that have a peculiarly undulating surface are known as *rolling prairies*. Vast herds of buffaloes used to roam over the prairies, but these have now disappeared. Immense tracts are now cultivated and produce large crops of wheat and maize. The prairies now constitute the most valuable agricultural region in the world.

Prairie Chicken, a common name in the United States of the pinnated grouse. See GROUSE.

Prairie Dog, a small animal, allied to the marmot, as well as to the squirrel, found on the



PRAIRIE DOG

prairies west of the Mississippi and east of the Rocky Mountains. These animals live in large colonies in burrows, and as they have a sharp bark, like that of a small dog, they are almost universally called prairie dogs. They are about one foot in length, exclusive of the rather short tail, and are sturdy and stout in form. Their burrows are close together and have a mound of earth near the entrance, on which the little animals are wont to sit and look around them. These communities are termed "villages." The prairie dog is not to be confounded with the gopher, to which it is allied.

Prairie du Chien, *pra're du sheen'*, the county-seat of Crawford co., Wis., situated on the Mississippi River 60 mi. s. of La Crosse and on the Chicago, Burlington & Quincy and the Chicago, Milwaukee & Saint Paul railroads. The important buildings are the College of the Sacred Heart and Saint Mary's Institute for girls. The industries include the manufacture of barrels, veneer, packing cases, pearl buttons, woolens and pickles. The town is of interest because of its historic associations. Near here was built a French fort in 1689. This, however, was soon abandoned, and another was built in

Prairie Squirrel

1755. Permanent settlement dates from 1783. At the close of the Revolutionary War the town and fort were ceded by the English to the United States. They were recaptured in 1812 and held for the space of four years, when they were again returned to the United States. Population in 1910, 3149.

Prairie Squirrel, the common striped gopher. See GROUND SQUIRREL; GOPHER.

Prairie Wolf. See COYOTE.

Pratt Institute, a co-educational institution for manual and industrial training, established in Brooklyn, N. Y., in 1887, by Charles Pratt. The institute comprises a high school, providing for general education, and normal, art, library, technical and trade departments. There are provisions for both day and evening classes. The department of domestic arts is especially famous for its excellent courses in sewing and cooking. The faculty numbers about 190, and the enrollment is 3500. The library contains over 107,000 volumes.

Praxiteles, *prax it' e leez*, one of the greatest sculptors of ancient Greece, a citizen, if not a native, of Athens, flourished about 364 B. C. He and his contemporary, Scopas, stand at the head of the later Attic school, so called in contradistinction to the earlier Attic school of Phidias. Without attempting to rival Phidias in grandeur, Praxiteles chose subjects which demanded a display of the human form, especially in the female figure. The finest is said to have been the Cnidian *Aphrodite* (Venus), whom he was the first to represent naked. The group *Niobe and her Children*, now in existence at Florence, is by some attributed to Praxiteles and by others to Scopas. His two statues of Eros, or Cupid, were also celebrated; one of them, placed in the temple of Eros, at Thespia, and the statue of a satyr, the *Faun* in the Capitol, were regarded by Praxiteles, according to Pausanias, as his finest works. Among his works were statues of Apollo, Dionysos and Demeter, in marble and in bronze, which served as models to succeeding artists. Quite recently a marble statue of Hermes by Praxiteles has been discovered at Olympia. The characteristics of the works of Praxiteles are beauty, grace and delicacy.

Preble, EDWARD (1761-1807), an American naval officer, born in Portland, Maine. He served in the Massachusetts marine during the Revolution and won distinction for his daring. He became a captain in the United States navy soon after its organization in 1799, and during the war with the Barbary pirates he commanded

Precious Stones

the American fleet which bombarded, with great effect, the port of Tripoli. However, in 1804 he was superseded and returned to the United States, where he retired, after receiving a medal and a vote of thanks from Congress.

Preble, GEORGE HENRY (1816-1885), an American naval officer, born in Portland, Maine. He enlisted in the navy in 1835, served during the Mexican War and accompanied Commodore Perry in his expedition to Japan. During the Civil War, in command of the *Katahdin*, he was present at the capture of New Orleans, later commanded a vessel in the blockade of Mobile Bay and was dismissed from the service for allowing the *Florida* to escape, but was reinstated. In the latter part of 1864 he coöperated with Sherman on the coast, and after the war he was given command of navy yards in various parts of the country. He retired in 1878, with the rank of rear admiral.

Precession, *pre sesh' un*, of the **E'quinoxes**, a slow motion of the line of intersection of the celestial equator, or equinoctial, and the ecliptic, which causes the positions occupied by the sun at the equinox to move backward or westward at the mean rate of 50.25" per year. This motion of the equinox along the ecliptic carries it, with reference to the diurnal motion, continually in advance upon the stars; the place of the equinox among the stars, with reference to the diurnal motion, thus precedes at every subsequent moment that which it previously held, hence the name. This sweeping round in the heavens of the equinoctial line indicates a motion of the axis of rotation of the earth, such that it describes circles round the poles of the ecliptic every 25,791 years. From the precession of the equinoxes and nutation in combination, the axis follows a sinuous path, instead of a circle, about the pole of the ecliptic (See NUTATION). At present the vernal equinoctial point is in the zodiacal sign Pisces, and it is moving toward the sign Aquarius.

Precious Stones or Gems, stones of small size, greatly esteemed for their beauty. They are sometimes found crystallized in regular shapes and with a natural polish, but they are more commonly of irregular shapes and have rough coats. The term *gem* often denotes more particularly a stone that is cut, polished or engraved, and it also includes pearls and various artificial productions. The most valuable gems are diamonds, emeralds, rubies, sapphires, opals and turquoises. Of less value are the garnet, the almandine, the tourmaline, the topaz, the amethyst, the chrysoprase, the chrysoberyl, the

Preëmption

aquamarine, the heliotrope and the azurite. Agate, lapis lazuli and cornelian can scarcely be called gems.

In art and archaeology, the term gem is usually applied to a precious stone cut or engraved in ornamental designs or with inscriptions. Stones on which the design is raised above the general surface are called *cameos*; those having the design sunk below the surface are called *intaglios*. Early specimens of cut gems are seen in the scarabaei, or beetle-shaped, signets worn in rings by the ancient Egyptians. Among the Greeks, Etruscans and Romans, gem sculpture held a high place, reaching its highest point under Augustus. Modern gem engraving dates from the beginning of the fifteenth century, the chief seats of the art being Italy and Germany. Rome is now the headquarters of the seal-engraving art.

The tools of the engraver consist of a lathe and a series of little rods, with heads of different shapes, all of which can be adjusted to the lathe. The axis of the lathe is pierced at the center with an orifice, into which the tools for cutting the stone are firmly fixed by means of a screw. The engraver wets the extremity of the mounted rod with diamond dust, made into a paste with olive oil, and as the wheel is in motion he applies the stone, firmly cemented to a piece of reed, to the revolving tool. The diamond dust enables the tool to cut into the stone with ease. As the design is frequently very elaborate and of the greatest delicacy, the tools are necessarily multi-form. The stones used for cameo cutting often exhibit layers of different colors, so that the raised design has a tint distinct from the ground. Intaglios are very often executed in transparent stones, and the subjects treated in this manner are more limited in number. Since 1870 the art of engraving gems has declined, and at the close of the nineteenth century there was little demand for cameos or intaglios. See GEMS, ARTIFICIAL.

Preëmp'tion, a right given under early public land laws to citizens of the United States, by which they could buy quarter-sections of the public land for a nominal price, by complying with certain conditions. A citizen who entered a preëmption claim was given preference over all other persons. The preëmption laws differed from the homestead laws in not requiring occupation or cultivation. They were repealed in 1891. See HOMESTEAD LAWS; LANDS, PUBLIC.

In international law, preëmption is the right

Preposition

of one nation to seize property belonging to another nation, while it is being shipped across the former's territory. The right is used only in the case of property that is or may be contraband of war, and full value is given to the owner of the property. See INTERNATIONAL LAW; CONTRABAND.

Premier, *pree'mi ur*, or *pre meer'* (literally *first*), the first officer of state, variously known as prime minister, chancellor, grand vizier, etc. In the constitutional nations of Europe, the cabinet form of government, as fully developed by England, has been more or less faithfully copied, consequently there is in each of these countries an official corresponding to the English premier. Canada and Australia have premiers, but the United States has no such officer; its secretary of state is not at all like the premier of England. He does not select the other members of the cabinet, is not superior to them, and is not responsible to Congress.

Pren'tice, GEORGE DENISON (1802-1870), an American journalist, born at Preston, Conn. He graduated at Brown University and was admitted to the bar, but never practiced law. He was the first editor of the *New England Review*, but in 1830 went to Kentucky, where he spent the rest of his life. He established the *Louisville Journal*, and by his satire and political ability he made it the foremost Whig newspaper in the West. Its influence probably did much to prevent Kentucky's secession at the beginning of the war. He became famous by practically originating the short, witty paragraph. He was a vigorous partisan, and his propensity for dueling was a common jest. Much of his verse and wit has been collected in book form.

Pren'tiss, BENJAMIN MAYBERRY (1819-1901), an American soldier, born at Belleville, Va. (now West Virginia). He removed to Illinois, entered the state militia, served against the Mormons and later took part in the Mexican War. In the Civil War, he entered the army as colonel of an Illinois regiment and soon became brigadier general of volunteers, with command of Cairo, an important military center. He was superseded by Grant. Later he fought at Shiloh; he bore the brunt of the assault, and after a spirited contest he was compelled to surrender. After being exchanged, he became a major general of volunteers and took part in the western operations.

Preposition, *prep o zish'un*, in grammar, a part of speech that introduces a phrase modifier

and shows the relation between the principal word of the phrase and the word the phrase modifies.

Pres'byter, an office bearer in the early Christian Church, the exact character and position of whom is differently regarded by different authorities. Presbyterians maintain that originally *bishop* and *presbyter* were one and the same; Episcopalians declare that from the first they were different, as was certainly the case in very early times. By the end of the second century the presbyters held a position intermediate between that of bishop and deacon and represented the priests, or second order of clergy.

Presbyte'rians, a class of denominations whose churches are governed by presbyters, or elders. The officers of a Presbyterian church consist of the pastor, elders and deacons. The pastor, together with the elders, looks after the spiritual affairs of the church, and the deacons look after the financial affairs. The pastor and elders constitute a *session*, which has power to admit and to discipline members. The session is under the control of a *presbytery*, which is composed of the ministers and one or more elders from each church in a given district. Presbyteries combine to form a *synod*, and, controlling all, is the *general assembly*, which meets annually and to which synods can appeal certain cases.

Calvin (See CALVIN, JOHN) is considered by some to be the originator of this form of church government, though elders constituted the ruling body among the Waldenses (See WALDENSES). Presbyteries were formed in England during Elizabeth's reign, though much against her will. The Presbyterian creed, confession of faith and form of church government and directory for worship were formulated by an assembly in 1647 and approved by Parliament in the same year, but they were never established in the Church of England. Presbyterianism was established in Scotland in 1560 under the leadership of John Knox (See KNOX, JOHN), and in 1592 it was ratified by Parliament. Presbyterians were among the early New England colonists, and many of them settled about Boston and formed the majority of the colony of Massachusetts Bay. The first American presbytery was organized in 1707, the synod of Philadelphia was formed in 1716 and a general assembly was organized in 1788.

There are several branches of the Presbyterian Church. The Cumberland Presbyterian

Church was organized in Tennessee in 1810, as a result of a revival movement, in which, owing to the scarcity of ministers, lay preachers were engaged. This led to the organization of a new body, which adopted the Westminster Confession of Faith, with a few changes, and maintained an independent existence well into the twentieth century. In 1905 it supported 2986 churches and 1649 ministers and had a membership of 186,000. In May, 1906, at the time of the meeting of the general assemblies of the Cumberland Presbyterian Church and the Presbyterian Church in the United States of America, a resolution of reunion was passed by both organizations, whereby the two bodies became one, as of old. The original church in the United States divided on the question of slavery just before the outbreak of the Civil War, and the United Synod of the Presbyterian Church South was organized. The Presbyterian Church of the Confederate States was also organized in 1861, and since the Civil War it has been known as the Presbyterian Church of the United States. It has a strong following in the South. The United Presbyterian Church of North America is distinguished by using only the Psalms in song; previous to 1881 it permitted no musical instrument in its churches. The Reformed Presbyterian Synod of Scotland organized a presbytery in Philadelphia in 1798 and still has some members in this country. The members of this branch of the church refuse to serve on jury, to enlist in the army or to vote at political elections. In 1902 the general assembly of the Presbyterian Church ratified a report which radically changed some articles of the creed. The Bible is considered the supreme standard of the Church, and whoever accepts the confession of faith does not necessarily accept every word and every phrase of it. In the revision, the doctrine of predestination was modified so as to embody the idea that God loves all mankind and that no man is condemned, except for his own sin; the article concerning infants who die before baptism was modified to embody the idea that all who die in infancy are saved by Christ, through his spirit. In 1910 the membership of all the Presbyterian churches in the United States was 1,848,046.

Pres'bytery, the pastors of all the churches of any particular Presbyterian denomination within a given district, with their presiding elders, who form a judicial body that ranks below the synod and above the session. The functions of the presbytery are, to grant licenses

to preach the gospel and to judge of the qualifications of such as apply for them; to ordain ministers to vacant charges; to judge in cases of reference for advice and in complaints and appeals which come from the church sessions within the bounds of the presbytery, and generally to superintend whatever relates to the spiritual interests of the several congregations under its charge, both in respect to doctrine and discipline. Appeals may be taken from the presbytery to the provincial synod and thence to the general assembly.

Prescott, ARIZ., the county-seat of Yavapai co., 137 mi. n. of Phoenix, on the Santa Fé, Prescott & Phoenix Railroad. The city is on an elevation of over 5000 feet, in a rich mining country, producing gold, silver and copper. Stock raising and lumbering are important industries. The city has a public library and contains the Saint Mary's Hospital and Home for Children, Saint Mary's Sanitarium and Saint Joseph's Academy and the Home for Aged and Infirm Arizona Pioneers. Population in 1910, 5092.

Prescott, WILLIAM (1726-1795), an American soldier in the Revolutionary War. He served in the last French and Indian war, declined an offer of a command in the regular British army and retired to his estate at Pepperell, Maine. Immediately after the Battle of Lexington in 1775, he organized a company of militia and joined the American army at Cambridge. He was at the head of the expedition to fortify Bunker Hill, commanded the American forces on Breed's Hill during the battle of June 16, 1775, and was the last to leave the field after the final British charge. He resigned his commission in 1777, but re-entered the army and fought at Saratoga. After the war he served in the Massachusetts legislature.

Prescott, WILLIAM HICKLING (1796-1859), an American historian, born in Boston. He was the grandson of Col. William Prescott, who commanded the American forces at the Battle of Bunker Hill. In 1811 he entered Harvard College. While there he met with an accident by which he lost his left eye, and the other became eventually so weak that during the latter half of his life he could scarcely use it. After spending two years in traveling through England, France and Italy, he returned to America, where he married and set himself assiduously to literary labor. Acquaintance with Spanish literature, which he began to cultivate

in 1824, led him to attempt his first great work on Spanish history, the *Reign of Ferdinand and Isabella*, published in 1837. It was received with enthusiasm, both in America and Europe. It was rapidly translated into French, Spanish and German, and its author was elected a member of the Royal Academy at Madrid. Prescott's next work was the *History of the Conquest of Mexico, with a Preliminary View of the Ancient Mexican Civilization and the Life of the Conqueror, Hernando Cortes*, which appeared in 1843 and was received with an equal degree of



WILLIAM H. PRESCOTT

favor. In 1847 he published the *History of the Conquest of Peru, with a Preliminary View of the Civilization of the Incas*. Eight years later the first two volumes of the long-expected *History of the Reign of Philip the Second, King of Spain*, appeared, and in 1858 a third volume was published; but before the work was completed, Prescott's death occurred, from apoplexy.

Prescription, in law, the right or title acquired by use and time. In almost all the states there are statutes regulating prescription. Generally an uninterrupted possession of twenty years is acquired for the acquisition of rights in real property.

President, *prez'i dent*, the supreme executive officer of the United States. A man to be qualified for this office must be a natural-born citizen of the age of thirty-five years and must

have resided fourteen years within the United States. He is elected by the vote of "electors" chosen by the people of each state. His salary is \$75,000 a year. He has the power of approving bills sent to him after passing Congress or of returning them to the house in which they originated. In his executive capacity he is at the head of all the administrative activities of the government and is commander in chief of the army and navy. His powers are prescribed in the Constitution. He holds his office for four years and is eligible for reelection.

In case of death or disability of the president, the vice-president succeeds to the office. On death of both president and vice-president the members of the cabinet succeed to the presidency in the following order: Secretary of State, Secretary of the Treasury, Secretary of War, Attorney-General, Postmaster-General, Secretary of the Navy, Secretary of the Interior. See UNITED STATES, subhead *Government*.

Press, **LIBERTY OF THE**, the liberty of every citizen to print whatever he chooses, under the limitation of being liable for abuse of that liberty. The right of printing rests on the same abstract grounds as the right of speech, yet it is only since men's views of the just limits of government have become clearer that the liberty of the press has been recognized as a right. The Constitution of the United States and those of many of the states declare for liberty of the press. Among European countries the liberty of the press is most complete among the weaker powers, such as Spain, Turkey, Sweden, Norway, Switzerland and Rumania; in France the press is comparatively free; in England it is practically free, but in Germany, Austria, and particularly in Russia, there are still many restrictions.

Pressburg, *pres'boorK*, a royal free city of Hungary, former capital of the country and the present capital of the County of Pressburg, beautifully situated on the left bank of the Danube and on spurs of the Carpathians. It is one of the finest cities of the kingdom. The most striking building is the ruined royal palace. The cathedral is a large Gothic structure which has of late years been considerably modernized. The Hungarian kings were formerly crowned in this cathedral. The townhall, which dates from the thirteenth century and contains a museum of Roman relics, is also worthy of mention. The manufactures of the city are various and include pastry, tobacco, machinery, leather, champagne and musical instruments. The

trade, particularly the transit trade, is extensive, and it consists largely in corn and timber. In 1541, when the Turks captured Buda, Pressburg became the capital of Hungary, and it held this position until 1784. The treaty by which Austria ceded Venice to France and the Tyrol to Bavaria was signed here in 1805. Population in 1910, 78,223.

Pressure, *presh'ur*. See **HYDROSTATICS**.

Pres'ton, a municipal and Parliamentary borough of England, in Lancashire, 28 mi. n. e. of Liverpool, on the north bank of the Ribble, near the head of its estuary. It has some fine buildings, among which are the townhall, the corn exchange and Saint Walbuge's Roman Catholic Church. The original staple manufacture of the town was linen, which is still woven to some extent, but which is now second in importance to cotton, of the manufacture of which Preston is one of the chief centers. The town has also machine shops, iron and brass foundries, railway carriage works, breweries, malt houses and tanneries. Population in 1911, 117,088.

Preto'ria a city of the Transvaal, in South Africa, situated in a fertile valley 30 miles n. e. of Johannesburg, with which it is connected by rail. The town is well laid out and is irrigated by streams of running water, which border its streets. It has a number of public squares and botanical and zoölogical gardens and also contains the government buildings of the former South African Republic, of which it was the capital. Its commerce is considerable. The city was founded in 1855. Population in 1911, 48,607, of whom 29,618 were of European descent.

Prevailing Westerlies or **Anti-Trades**, the surface winds of the temperate regions, which in the Northern Hemisphere blow from the west-southwest and in the Southern Hemisphere from the west-northwest. These winds blow over the entire Temperate zones and extend into the Frigid zones. The upper and lower currents in the regions traversed by the westerly winds blow in nearly the same direction, consequently these winds are of greater depth than trades. They are caused by the return current, which starts from the upper end of the ascending current over the belt of equatorial calms. As these currents cool they descend, and by the time they have reached the temperate latitudes they become surface currents. On the sea the prevailing westerlies are quite constant, though subject to more local interruptions than are the trade winds, but on the land they are frequently so

Priam

modified by local influences that they are extremely difficult to trace. In the Southern Hemisphere, between the 40th and 60th parallels, these winds attain such force that the sailors call them the *roaring forties*. Before the days of steamships, these winds were of great assistance to vessels sailing eastward. See TRADE WINDS; WIND.

Pri'am, in Greek legend, the last king of Troy, the son of Laomedon. By his second wife, Hecuba, he had, according to Homer, nineteen children, among them Hector, Paris, Cassandra and Troilus. His name has been rendered famous by the tragic fate of his entire family, as a result of the Trojan War. Homer gives no account of the death of Priam, but other poets relate that he was slain at the altar of Jupiter by Pyrrhus the Greek. See TROY.

Pribilof, *pre be loh'*, **Islands** or **Pribylov Islands**, a group of islands on the coast of Alaska, in Bering Sea. The largest are Saint Paul, Saint George and Walrus islands. They abound in fur seal and are consequently an important center of the seal fishery.

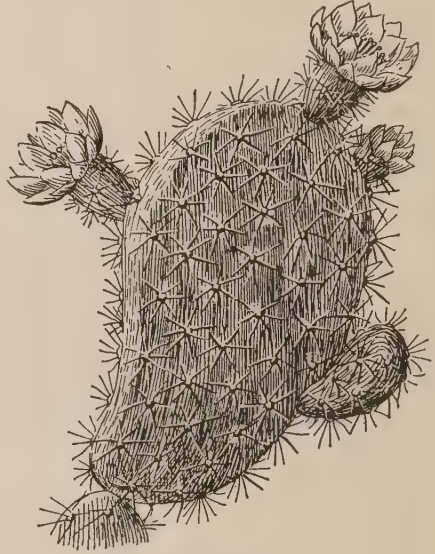
Price, **STERLING** (1809-1867), an American soldier, born in Prince Edward County, Va., and educated at Hampton-Sidney College. He removed to Missouri in 1831 and was elected to Congress, but resigned and entered the army to serve in the Mexican War. He participated in Kearney's expedition to California and later defeated the Mexicans near Chihuahua. In 1853 he was elected governor of Missouri and served two terms. At the outbreak of the Civil War, he wavered for a time between the Southern and the Northern parties, but finally joined the secessionists, and as major general of the State of Missouri troops he contested the territory of Missouri with the Federals under Fremont and Curtis. He served under Beauregard and Van Dorn around Corinth and in Tennessee, but in 1863 he was transferred to the department west of the Mississippi.

Prickly Ash or **Toothache Tree**, the common name of a North American shrub or small tree, which has leaves resembling the ash and whose bark has a hot, fiery oil that is sometimes used for the relief of toothache.

Prickly Pear or **Indian Fig**, a name given to an American genus of cacti containing about one hundred and fifty different species, most of which grow in the southwestern United States. The common prickly pear is a perennial and bears yearly, between June and October, beautiful, showy, solitary flowers, sometimes red or

Priest

white, but usually yellow, about three inches in diameter. The stem is composed of flat, oval joints, which grow in zigzag forms and are leafless, but covered with sharp spines. The edible fruit, which resembles a fig or pear, has clusters of prickles on the skin. Some species found in dry, subtropical regions, as the indian fig, yield large crops of nutritious fruit, where few other



PRICKLY PEAR
The cochineal cactus.

plants will grow, while other hardier varieties, after the spines have been removed, serve as forage for cattle. Burbank has produced a spineless variety, demonstrating the possibility of greatly improving the plant by cultivation. In dry pastures the prickly pear becomes a nuisance, but it may be eradicated if the field is burned over and the grass encouraged to crowd out the cactus. See COCHINEAL.

Pride's Purge. See RUMP PARLIAMENT.

Priest, in its most general signification, a man whose function is to inculcate and expound religious dogmas, to perform religious rites and to act as a mediator between worshipers and whatever being they worship. In some countries the priesthood has formed a special order, or caste, the office being hereditary; in other countries it has been elective. In sacred history the patriarchal order furnishes an example of the family priesthood. Abraham, Isaac and Jacob performed priestly acts and drew "near to the Lord," as did also Job, and the Arab sheikh to-day unites in his person the civil and religious

headship. The Mosaic priesthood was the inheritance of the sons of Aaron, of the tribe of Levi. The order of the priests stood between the high priest and the Levites. In some churches the term *minister* or *pastor* is employed instead of priest. Those Christians, however, who, like the Roman Catholics and Greeks, look upon the eucharist as a sacrifice, regard the priest as performing sacrificial duties and as standing in a special relation between God and his fellow men. The priests of the Church of Rome are bound to a life of celibacy; but in the Greek Church, a married man may be a priest. In the Anglican and other Episcopal churches, the priests form the second order of clergy, bishops ranking first.

Priestley, JOSEPH (1733-1804), an English philosopher and clergyman, born near Leeds. In 1774 he discovered oxygen, which he quickly followed by other important discoveries in chemistry. Among his works are *Experiments and Observations on Different Kinds of Air* and *The Doctrine of Philosophical Necessity*.

Prim, JUAN, Marquis de los Castillejos, Count of Reus (1814-1870), a Spanish statesman and field marshal. He assisted greatly the movement which ended in the downfall of Queen Isabella, and in the new government he was appointed minister of war. The crown of Spain he first offered to Leopold of Hohenzollern, and this precipitated the Franco-German War. He afterwards procured the election of Amadeus, duke of Aosta, to the throne.

Primary, DIRECT, a method of election by which the voters of a party may express their preference for candidates for nominations to public office. Under this system the names of candidates whose petitions are signed by a certain percentage of the party voters are placed on the ballot and are voted on by the registered party voters.

Pri'mates, the highest order of mammals. In it are included the squirrel-like lemurs, apes, monkeys and man. The primates may be described as hairy mammals, with five digits on each limb, all provided with flat nails instead of claws. Their fore feet are usually grasping hands, and their hind feet are often used for grasping, though in some instances solely for walking. The first suborder includes the lemurs; the second, the apes, who are different not only in mode of life, but also in structure. The apes are separated into two divisions, based principally upon the character of the nostrils, though there are other distinctions. By this classification the anthropoid apes and man belong to the second

division, those whose nostrils open downward and are close together (See APE). The orangutans and the chimpanzees are the most nearly related to man in structure, the former resembling him in the number of ribs and in the form of the brain, the latter in the proportion of the limbs to the body. The greatest difference between man and the apes is in the size and structure of the cerebrum and forebrain, which in man is twice as large as in the gorilla. Moreover, in the ape the cerebrum is comparatively smooth, while in man it has a great number of folds, which marks the increased intelligence of the latter. According to Professor Haeckel, the only characteristics which differentiate man from the apes are his erect walk, the modification of his fore and hind limbs, the existence of articulate speech and the faculty of reason. See AYE-AYE; BABOON; LEMUR; MARMOSET; MONKEY.

Prime Number. See NUMBER.

Primogeniture, *pri mo jen'e ture*, the right of the eldest son and those who derive through him to succeed to the property of an ancestor. The institution existed among the ancient Hebrews, but was particularly developed under the feudal system. Before the Norman conquest the descent of lands in England was to all the sons alike, but later the right of succession by primogeniture came to prevail almost everywhere. It is entirely abolished in France and Belgium, but it prevails in some degree in most other countries of Europe. The rule operates only when a person dies without will, and is as follows: The eldest son is entitled by law to the whole real estate. If he is dead, but has left an eldest son, the latter succeeds to his father's right. If the whole male line is exhausted, then the daughters succeed—not in the same way, however, but jointly, except in the case of the crown, to which the eldest succeeds. In the United States no distinction of age or sex is made in the descent of estate. See ENTAIL.

Primrose, a genus of beautiful Alpine plants, in all of which the flowers rise on slender stems from a group of broad hairy leaves. There are about 150 species, all of which are natives of Asia or Europe, except two unimportant species of North America. The common *primrose* has pale yellow blossoms and grows abundantly in the woods, meadows and hedges of Europe. The English *cowslip* is very similar to the common primrose, except that the flowers are brighter yellow. In the United States the primrose cultivated so extensively is a Chinese variety. It

blooms frequently and has large clusters of fragrant flowers, varying in color from delicate shades of pink to violet and purple. Several



COMMON PRIMROSE

Japanese and other varieties are cultivated in gardens as ornamental plants.

Prince, literally, one who holds first place. In modern times the title of prince (or princess) is given to all sovereigns generally, as well as to their sons and daughters and nearest relations. In Germany there is a class of sovereigns who bear the title of prince, *Fürst*, as a specific designation; members of royal families are called *Prinzen*. On the Continent there are many ancient families not immediately connected with any reigning house, who bear the title of prince, while in England dukes and earls are sometimes called princes.

Prince Edward Island, an island forming a province of the Dominion of Canada, located in the Gulf of Saint Lawrence and separated by Northumberland Strait from New Brunswick, on the east, and Nova Scotia, on the south. Its greatest length, from east to west, is about 130 miles; its breadth varies from 4 to 34 miles, and its area is 2184 square miles. The coast line presents a remarkable succession of large bays and projecting headlands. The surface undulates gently, nowhere rising so high as to become mountainous, or sinking so low as to form a monotonous flat. The island is naturally divided into three peninsulas, and the whole is well suited for agriculture and pasturing, the forests now being of comparatively limited extent. The prevailing rock is a reddish sandstone, but a large part of the surface is evidently alluvial. The climate is mild; winter is free from damp, unwholesome chills; and summer, without being oppressively hot, is fitted to promote the growth of all the ordinary cereals. Sheep, cattle and horses are reared in considerable numbers; cod, mackerel, herring,

oysters and lobsters form the most productive part of the fisheries. The manufactures are chiefly confined to linen and flannels for domestic use. The exports consist of timber, agricultural produce and live stock, and the imports include dry goods, hardware, cordage and iron.

A railway runs from one end of the island to the other. The capital is Charlottetown. The public affairs of the island are administered by a lieutenant governor, nominated by the Crown, who appoints an executive council of nine members. There is also a legislative assembly of a single house, elected by the people. There is an excellent educational system, the elementary schools being free. The island is supposed to have been discovered by Cabot in 1497. It was first colonized by France, was captured by the British in 1745, was restored and recaptured and finally in 1873 it was admitted to the Dominion of Canada. Population in 1911, 93,728.

Prince Rupert, a city of British Columbia, Canada, situated on Kaien Island. It is the western terminus of the Grand Trunk Pacific Railway and has direct steamship connection with important foreign ports. Cold storage and fish-curing plants, besides other manufactures, are of great importance. Population in 1911, 4184.

Princeton, IND., the county-seat of Gibson co., about 27 mi. n. of Evansville, on the Southern and the Evansville & Terre Haute railroads. The city is in an agricultural and coal-mining region, and contains large lumber and brick yards, shops of the Southern railroad and several factories. It was settled in 1804 and chartered as a city in 1884. Population in 1910, 6448.

Princeton, N. J., a borough of Mercer co., on the Pennsylvania railroad, about 50 m. s. w. of New York. It is famous chiefly as the site of Princeton University, whose buildings are the most noteworthy of the city. A famous battle of the Revolutionary War was fought at Princeton. Population in 1910, 5136.

Princeton, BATTLE OF, an important battle of the Revolutionary War, fought January 3, 1777, about a week after the Battle of Trenton. On January 2, the American army was established on the bank of the Assunpink River; Cornwallis, with a large force, was upon the opposite shore, preparing to make a general attack the following morning. Washington evaded battle by moving his whole army about Cornwallis's position to the northward, leaving a few men to build fires and make noise about the site of his camp, thus to deceive the British commanders. He soon met a force of about

2000, coming from Princeton to join Cornwallis. After a hard battle the British were routed and Washington took up a strong position at Morristown, while Cornwallis retreated northward through New Brunswick to New York, thus practically abandoning the State of New Jersey.

Princeton University, a university located at Princeton, N. J., founded by the Presbyterian Synod of New York in 1746 as the College of New Jersey. The school was originally established at Elizabethtown. In 1748 it was moved to Newark, where it remained until its permanent location at Princeton. On the one hundred fiftieth anniversary of its founding, the college of New Jersey became Princeton University. As now organized, the university has scientific and academic courses of study, requiring four years for completion, and graduate courses, which constitute the university work in all departments. It maintains 9 laboratories, 2 astronomical observatories, and museums of geology and archaeology, biology, morphology and historic art. The general library contains over 291,000 volumes, and there are special libraries connected with the laboratories. The faculty numbers about 200, and the enrollment is over 1500. The endowment is about \$5,000,000. While non-sectarian, this school is conducted under the auspices of the Presbyterian Church, under which it has acquired a leading influence.

Printing, the art of stamping letters, figures or other characters upon paper, cloth or other material. In its ordinary sense the term means the impressing of characters upon paper.

HISTORY. The origin of printing is unknown. It is probable that the Egyptians and Babylonians engraved characters on precious stones, which were set in rings or other jewels and used for the purpose of impressing their signatures upon official documents. Some assert that the Romans knew the art of printing, but would not use it because the authorities believed that the spreading of intelligence would lead to uprisings among the people. As far as definitely known, however, the first printing was done by the Chinese during the last century before the Christian era. These people used engraved blocks, instead of type, and they still continue to print by this method. There has been a great deal of dispute over the invention of printing with movable type, as we know it to-day. The Germans claim that Johannes Gutenberg was the inventor, while the Dutch assert that this honor is due to Laurens Coster of Holland. The weight of

evidence seems to be in favor of Gutenberg, and he is now generally considered to have been the inventor, since he was the first to establish printing on anything like a scientific basis. See COSTER, LAURENS; GUTENBERG, JOHANNES.

The exact date of the invention of printing is not known, but it occurred sometime between 1424 and 1448. Gutenberg's printing office was at Mainz, Germany, and the first book printed was a copy of the Old Testament, which was completed between 1450 and 1455. This work is now known as the Mazarin Bible, but it is not known whether it was printed by Gutenberg or by Faust, or by the two in partnership. After Gutenberg's death the work was continued by John Faust, who kept the process secret until Mainz was captured in a war and the workmen were obliged to flee. These printers soon set up establishments in other cities, and by the end of the fifteenth century there was a printing office in nearly every important city of Europe. Printing was introduced into England by William Caxton in 1477.

The first printing press in America was set up in the City of Mexico sometime between 1540 and 1550. The first press in the United States was established at Harvard College, Cambridge, Mass., in 1638. This press is of great historic interest. The first article printed on it was the *Freeman's Oath*, the second was an almanac and the third was the first edition of John Eliot's famous *Indian Bible*. This was also the beginning of what is now the University Press, one of the largest and best-known printing establishments in the world. Presses in other colonies followed, and within the next hundred years each had one or more printing establishments. After the Revolutionary War the printing industry in the United States started anew, and it has continued to keep pace with the growth of the country.

PROCESSES. Printing includes the three processes of composition, make-up, or imposition, and press work. As the first is now practiced it is necessary to add to these, stereotyping and electrotyping, each of which is described under its appropriate title.

Composition. By composition is meant typesetting, which is the first step in printing. The typesetter is called a *compositor*, and the stand which holds his type is called a *case*. When the work is done by hand, the compositor sets the type in a small metal frame, called a *stick*. This holds about fifteen lines of ordinary type, and

when it is filled the compositor places the type in a long, narrow frame with a metallic bottom and three sides, called the *galley*. After the type for the copy has been set, a rough copy, called the *proof*, is taken from the galley. This is read and corrected, and the copy is given to the compositor, who proceeds to correct his errors. When this has been done, the type is ready for the next process. For machine composition see **LINOTYPE**; **MONOTYPE**.

Make-up, or Imposition. This process includes arranging the type into pages, putting in the head lines, page numbers and running titles. It is done on a stone or on an iron-topped table, and the workman who does it is known as the *stone man*. The type for each page is held together by a string that is wound around it. When made into pages, it is placed in an iron frame, called the *chase*, and is wedged in so tightly that the single types cannot fall out when the chase is moved. The chase and type, when arranged for the process, constitute the *form*. The size of the form varies from 1 page to 128 pages, according to the size of the page and the work. The most common sizes contain 16 or 32 pages. The pages are so arranged that the right numbers will face when the sheet is folded. Only small editions of papers and circulars are now printed directly from type. All others are printed from stereotype or electrototype plates, and when this is done the type, as soon as made into pages, is sent directly to the foundry. The plates are then placed in the form. See **ELECTROTYPING**.

Press Work. The actual printing is done on the printing-press, which is a machine for pressing the paper down upon the face of the type. The type is inked by running rollers over the form just before the paper is pressed down upon it. The paper is fed into the press in single sheets or from a roll, according to the plan of the press and the kind of printing. Circulars, books, pamphlets and country newspapers are printed from sheets, but large newspapers and magazines which have a large circulation, are printed from a roll. As the roll is printed it is made into sheets, which are folded by a machine. The modern newspaper and magazine presses do this work very rapidly, some of them having a capacity of 150,000 copies of twelve-page papers per hour. Circulars, job work and most country papers are printed on small presses that may be run by power or by hand, as desired.

COLOR PRINTING. Printing-presses are con-

structed which will print in three or more colors, and by their use inexpensive colored pictures are produced. Many of the large city dailies now have one section of their press fitted for color work, and on this the colored supplements and covers of the Sunday edition are printed. Both color printing and plain printing are often done on one of these presses at the same time, and some of them can print as many as eleven or twelve colors. In the three-color process, which produces pictures of high grade, the three primary colors—red, blue and yellow—are used, and the other colors are produced by printing these one over the other, different proportions being used for different tints. Three halftones of the picture are prepared, each representing the part that is to receive a certain color, and three impressions are required to complete the picture. Most colored pictures in books and magazines are made by this process. See **LITHOGRAPHY**, subhead *Color Lithography*.

Printing and publishing in the United States rank fourth in the great manufacturing industries. The value of the yearly output of books, papers and other printed matter is over \$700,000,000. See **NEWSPAPER**; **PRINTING PRESS**; **TYPE**.

Printing Press, a machine for printing upon paper or other material. The necessary parts of a printing press are the *bed*, for holding the type form; a device for inking the type; a *platen*, for pressing the paper upon the type; the frame for holding these parts, and the necessary gear for operating them.

The first printing press was a modification of the wine press and was a very crude affair, consisting of a bed, upon which the forms were placed; a board, for a platen, and a screw, for pressing the platen down upon the type. The frame was of wood and rudely constructed. The type was inked with a leather ball, stuffed with cotton. The paper was then laid upon the form and the platen placed over it, after which the form was shoved under the screw, which was turned with a lever. This was the press designed by Gutenberg and used for several centuries with little or no improvement. The first improvement in Gutenberg's press consisted in substituting iron for wood in making the frame; the next was in adding a spring to lift the platen when the screw was released, and the next, and by far the most important, in substituting a lever for the screw in operating the platen. Inking devices and the crank and pulley arrangement for moving the form were added, and this pattern

of press is still in common use in country offices and for printing photo-engravings and other illustrations.

The cylinder press was the next great improvement in the printing press. It was invented by Friedrich Koenig in 1806 and was first used in 1814 in printing the London *Times*. This press takes its name from the large cylinder which constitutes the platen. As it revolves this cylinder seizes the paper and impresses it upon the type. The form is placed on a movable bed, so that it moves back and forth under the platen and the ink rollers at each impression. A good press of this pattern will make from 1500 to 2000 impressions per hour. Double cylinder presses are sometimes constructed with a device for turning the paper, so that both sides of the sheet are printed without rehandling. The old-style cylinder press is a common object in all country printing offices.

The most recent development in the printing press is in the invention and perfection of what is known as the web perfecting press, invented by Mr. Richard Hoe of New York in 1871. In presses of this pattern the forms are cylinders, and the stereotype plates are made in half-cylinders and clamped in position on the press. These cylinders are so placed that they print both sides of the sheet at once, and also print the paper from a roll, or web. The press is so planned that any number of parts can be added, so that a quadruple, a sextuple or an octuple press can be constructed, as desired. These additions are made either by setting the presses side by side, or by placing them one above the other, which is the more common plan. The work of one of these presses is so rapid that it is impossible for the untrained observer to follow the paper as it rushes through the machine. When running at full speed the roll of paper is unwound and printed at the rate of 35 miles per hour (See NEWSPAPER, subhead *Printing*). Many of these presses are also arranged so that a portion of the paper can be printed in colors.

While the web perfecting press was constructed for the purpose of printing large daily papers, it has since led to the construction of other patterns for the use of large magazine and book establishments, and now some of the best work in the country is produced on presses of this pattern. See PRINTING.

Prism, *priz'm*, a geometric solid, two of whose faces, called *bases*, are equal parallel polygons, and whose other faces, called *lateral faces*, are parallelograms. When the edges of the lat-

eral faces are perpendicular to the bases, the prism is a *right prism*; otherwise it is *oblique*. The area of the surface of a prism is equal to the perimeter of the base (that is, the sum of the length of its sides) multiplied by the altitude (that is, the perpendicular distance between the two bases). The volume is equal to the area of one base multiplied by the altitude. In optics, the prism is a transparent body, with two plane faces not parallel to each other. It is usually made of glass.

Prison, *priz'un*, a house in which a person is confined and thereby deprived of his personal liberty; especially, a building for the detention, confinement or safe custody of criminals and accused persons. Imprisonment is now one of the recognized methods of judicial punishment; but formerly it was employed for purposes of injustice and oppression, through the inefficiency of the law to protect those who were offensive to the powerful. Even in Great Britain, where the laws have always condemned the incarceration of the innocent, the prison was, by the connivance of the authorities, made subservient to gross injustice and cruelty. In the eighteenth century the proper regulation of imprisonment began.

In the early part of the nineteenth century the most advanced examples of prison discipline and construction were to be found in the United States, and although in the second half of the century this prominent position has not been maintained, the improvements initiated in America were vastly important. The Philadelphia Society for Assisting Distressed Prisoners was founded in 1776—the first of the kind in the world—and, though dissolved during the war, it was reorganized in 1787 and is still at work. Large measures of reform were quickly secured; by 1790 the principle of separation was recognized, and in 1794 all convicts were separated and secluded; in the latter year, also, capital punishment was abolished in Pennsylvania for all crimes but murder in the first degree. It thus became necessary to devise some substitute for capital punishment. At the Eastern Penitentiary, at Philadelphia, opened in 1829, the so-called "Pennsylvania system" of permanent seclusion of convicts was carried out. Evil effects arose from the rigorous application of this principle, and even at Philadelphia the system is not now strictly enforced, while in all other American prisons what is known as the "Auburn system"—silent labor in association by day, and separation by night—has been adopted. In the

Southern states, prisoners are sometimes leased out to the highest bidders for the terms of their sentences; but this system, which condemns the convicts to a slavery that is not modified even by considerations arising from personal ownership, is being abandoned. The first place of detention for juvenile delinquents was opened in New York, in 1825; the first reformatories on the cottage, or family, system were established in Ohio—for boys at Lancaster in 1858, for girls at Delaware in 1878. In 1877 the Elmira (N. Y.) Reformatory was opened, at which a now famous system has been adopted for the treatment of first offenders under thirty years of age; the principal features are indeterminate sentences, the classification of prisoners into three classes under the mark system and discharge upon probation, under supervision.

Many indulgences are granted to the prisoners to induce them to work, so that the penal element of a sentence of imprisonment is almost entirely absent. It may be added that crime has increased in the United States in a ratio far in advance of the growth of population; in 1850 the prisoners represented 1 in 3442 of the population, in 1911 they were 1 in 800.

Prisoners of War, persons captured from the enemy in time of war. In ancient times prisoners of war became the slaves of their captors, and even yet it is a recognized principle among nations that all the inhabitants of a vanquished town, state or nation become the absolute property of the victors, though it is hardly necessary to say that the principle is now no longer acted upon by civilized nations. Prisoners of war are now either kept until the war is over, are released on parole or are exchanged for prisoners taken by the other side.

Privateer, a vessel of war, owned and equipped by private individuals, to seize or plunder the ships of an enemy. Such a vessel must be licensed by a government and must be under a letter of marque, otherwise it is a pirate. In 1818 Congress passed a law forbidding enlistments on foreign privateers. By the Declaration of Paris, 1856, the great powers of Europe mutually agreed to abandon the right to arm privateers in case of war; but several nations, the chief ones being the United States and Spain, have not agreed to this, and it is doubtful whether it will be always strictly acted upon even by the parties to the declaration. The practice of privateering, while useful to maritime countries, and necessary at one period to England, is very

harassing to trade and gives endless opportunities for private plunder.

Privy Council, the council of state of the British sovereign, convened to discuss matters connected with the public service and for the honor and safety of the realm. As it exists at present, the number of members of the privy council is indefinite; they are nominated by the sovereign at pleasure. The list of privy councilors now embraces, besides the members of the royal family and the members of the cabinet, the archbishops and the bishop of London, the great officers of state, the lord chancellor and chief judges, the speaker of the House of Commons, the commander in chief and some other persons. Officially at the head is the lord president of the council, who is appointed by patent, and who manages the debates and reports them to the sovereign. See ENGLAND, subhead *Government*.

Privy Seal, a seal appended by the British sovereign to certain grants or documents. Since the time of Henry VIII the privy seal has been the warrant of the legality of grants from the crown and the authority for the lord chancellor to affix the so-called *great seal*; such grants are termed *letters patent*. The officer who has the custody of the privy seal is called *lord privy seal*, and is the fifth great officer of state, having also, generally, a seat in the cabinet.

Probate, the proof before an officer, authorized by law, that an instrument offered to be recorded is the last will and testament of the deceased person whose act it is alleged to be. The party presenting and upholding the instrument is termed the *proponent*, and the party disputing, if any, the *contestant*. In the United States, generally speaking, proofs cannot be taken until notice has been issued by the judges to all the parties interested to attend. On the return of the notice, the witnesses are examined and the trial proceeds before the court. If the judge, when both parties have been heard, decides in favor of the will, he admits it to *probate*; if against the will, he rejects it and pronounces the sentence of *intestacy*. The functions of this branch of the judiciary are confined to deciding on the authenticity of wills and upon the proper persons to act as administrators when no will exists or when no executors are named. See WILL.

Probus, MARCUS AURELIUS, Roman emperor from 276 to 282. At an early age he attracted the notice of Valerian, by whom he was placed at the head of a legion; and the brilliancy of his subsequent conduct in the African, Persian,

Arabian and Germanic campaigns brought him into still more prominent notice. On the death of the emperor Tacitus, in 276, the army hailed him as emperor, a selection immediately confirmed by the Senate and people of Rome. His chief struggle during his reign was to guard the frontiers of the Empire against the barbarians, a task which he carried out with great success, both in Europe, Asia and Africa. He settled large numbers of barbarians in the frontier provinces and admitted them to his legions and devoted himself to the making of roads and draining of marshes. His skilful administration and public virtues did not, however, protect him from enmity; and after a short reign he was murdered in a military insurrection.

Proce'dure, in law, the method of proceeding in a lawsuit throughout its various stages, civil procedure being the rules for conducting a suit in civil law, and criminal procedure being the rules for conducting a criminal case.

In the United States, when redress is sought for a civil injury, the injured party brings an *action* against the offender, who thereby becomes the *defendant*, the complainant being known as the *plaintiff*. The action is begun by issuing a *writ of summons* (See WRIT), commanding the defendant to *appear* in court. If he fail to do so, an *appearance* is entered for him by the plaintiff. When both parties have entered an appearance they are said to be *in court*, and the suit may be commenced. The next stage is the *pleadings*, or the statements in legal form of the position of the two parties to the suit. Next the *issue* is argued. This may be a matter of law, the facts being admitted, in which case it is called a *demurrer*, or it may be a question of fact. In the former case the decision rests with the *judge*; in the latter, with the *jury*. In a jury trial, after the evidence has been submitted, the judge sums up the law bearing upon the issue, the jury retires, enters a *verdict*, that is, comes to a conclusion, and the judge then pronounces *judgment*, that is, announces the decision and the consequences which the court has fixed to the act.

In criminal cases the first step is the *arrest* of the one charged with the crime; that is, he is taken into custody of the law. He is then brought before a judge or magistrate to be *examined*, and he may be held to answer for his action to the grand jury (See JURY AND TRIAL BY JURY), or he may be dismissed for lack of evidence; or, if the grand jury has already entered *indictment*, he may be held for *trial*

before a *petit jury*. Pending trial, he is either allowed his freedom upon giving *bail*, or bond, for his appearance, or he is committed to jail. If the grand jury enters indictment, the prisoner is held for trial before a petit jury; if found not guilty, he is discharged; if found guilty, he is sentenced to punishment. In the latter case an *appeal* may be granted, that is, the right of a defeated party to carry his case to a higher court for determination, on account of a flaw in the conduct of the case at the earlier trial. See CRIME.

Proc'ne. See PHILOMELA.

Proc'ter, ADELAIDE ANNE (1825-1864), an English poet, born in London. Assuming the name of Mary Berwick, she became a contributor in 1853 to *Household Words*. This periodical was edited by Charles Dickens, who became interested in the young poet and aided in gaining for her public recognition. Later poems were published in *All the Year Round*. A collection of her verses, nearly all of which had appeared in these two magazines, was issued in 1858. A later edition of them contains her biography, written by Dickens. Her best known song is *The Lost Chord*.

Procter, BRYAN WALLER (1787-1874), an English poet. His first published work was entitled *Dramatic Scenes and Other Poems* and appeared in 1819, under the pseudonym of Barry Cornwall, which remained Procter's pseudonym in his future writing. As this volume was well received, he published shortly thereafter *A Sicilian Story* and *Marcian Colonna*. In 1812 he produced a tragedy, *Mirandola*, which was performed with great success at Covent Garden. Procter also wrote several other books of poetry and a variety of prose works, the most interesting of which was his *Memoir of Charles Lamb*, of whom he was an intimate friend. Procter's poems exhibit much delicate grace and refinement, but they have never attained great popularity.

Proc'tor, RICHARD ANTHONY (1837-1888), an English astronomer, educated at King's College, London, and at Cambridge. After a literary life of some length, during which he contributed a number of articles to magazines, including, especially, the *Popular Science Review*, he became editor of the *Proceedings* of the Royal Astronomical Society. In 1874 he made important researches in the transits of Venus, and after making four lecture tours through America he finally settled in Missouri. Most of his publications are of a popular character

and have contributed a great deal to the enlightenment of the general public. Among the best of his books are *Saturn and His System*, *Half Hours with a Telescope*, *Other Worlds than Ours*, *The Romance of Astronomy*, *Hereditary Traits*, *The Great Pyramid* and *Nature Studies*.

Prof'it, the gain resulting to the owner of capital from its employment in buying and selling, in manufacturing or in any commercial undertaking. *Net profit* is the difference in favor of a seller between the selling price of commodities and the original cost, after deducting all charges. The *rate of profit* is the proportion which the amount of profit derived from an undertaking bears to the capital employed in it. *Profit and loss* is the gain or loss arising from goods bought or sold or from any other contingency. In bookkeeping both gains and losses are entitled *profit and loss*, but the distinction is made by placing the former on the credit side and the latter on the debit side.

Progres'sion, in mathematics, a regular or proportional advance in increase or decrease of numbers. A continued *arithmetical progression* is one in which the terms increase or decrease by equal amounts. Thus, 2, 4, 6, 8, 10, is an arithmetical progression, the increment being 2. A *geometrical progression* is one in which the terms increase or decrease in a certain constant ratio, as 2, 4, 8, 16, 32, 64, the constant multiplier in this case being 2.

Progressive Party, NATIONAL, a political party in the United States, organized at Chicago in 1912. The progressive element in the Republican party opposed the renomination of President Taft at the national convention in 1912, and tried to secure the nomination of Theodore Roosevelt. In organizing the convention, however, the regular Republicans secured control and seated Taft delegates in nearly all the contested delegations. The supporters of Mr. Roosevelt charged that these delegates were fraudulently seated, and they refused to participate in any further action of the convention. In August the progressives held a national convention at Chicago, adopted a platform emphasizing the need for economic reform and social justice, and nominated as its candidates Theodore Roosevelt and Hiram W. Johnson, governor of California. The party polled over 4,000,000 votes, and carried five states. In the state and local elections of 1914 its vote was small, and its candidates were defeated almost everywhere.

Prohibition, *pro he bish'un*, **Party**, a political party in the United States, which advocates the prohibition of the sale or manufacture of intoxicating liquors. It was organized at Chicago in 1869. Since 1884 it has forced action in every state on the regulation of the liquor traffic. Its presidential candidates have never had any chance of election, though the Prohibition vote has increased from 5600 in 1872 to over 250,000 in 1912. The Prohibition party, however, has been a great factor in the temperance movement. See **POLITICAL PARTIES IN THE UNITED STATES**; **TEMPERANCE**.

Prometheus, *pro me'thuse*, in Greek mythology, one of the Titans, brother of Atlas and Epimetheus and father of Deucalion. His name means *forethought*, as that of Epimetheus signifies *afterthought*. In his desire to perform some great favor for the race of man, Prometheus stole fire from heaven and brought it to earth, thus rousing the anger of Jupiter, who, to punish him, sent Pandora with all the ills, to afflict human beings, besides having Prometheus himself chained by Vulcan to a rock. Here an eagle came every day and devoured his liver, which during the night grew again. This torture Prometheus endured for centuries, until he was set free by Hercules.

Prom'issory Note, a written promise to pay a certain sum of money, either on demand or at a future fixed or determinable time. If it is payable to the order of a person or to bearer, it is negotiable. The following is the most common form of a negotiable promissory note:

\$500.

CHICAGO, ILL., March 9, 1907.

Sixty days after date I promise to pay C. D., or order, five hundred dollars, with interest at the rate of six per cent per annum, for value received.

A. B.

This note will be negotiable when endorsed by C. D. If it is sold or transferred without his endorsement, the person to whom it is transferred accepts only such rights in it as C. D. possesses. The one who makes the promise is the maker of the note, the one to whom the promise is made is the payee. See **NEGOTIABLE INSTRUMENTS**.

Prong'horn, a small goat antelope, which once ranged over the whole of the United States west of the Missouri River, but which is now confined to the unsettled parts of the West. It is an alert, lively little animal, about four and a half feet long, and loves the open plains and

Pronoun

wooded glades of the mountains. It is excitable and runs with great rapidity when frightened. Though not a true antelope, it is generally called by that name wherever found.

Pro'noun, in grammar, a part of speech that represents an object, but does not definitely name it. It usually stands in place of a noun. The pronouns in commonest use are of the following classes: *personal*, I, thou, you, he, she, it, with their various case and number forms; *conjunctive*, or *relative*, who, which, what and that; *interrogative*, who, which and what; *indefinite*, some, any, much and the like; and *demonstrative*, this, these, that, those.

Proof, in printing, a rough impression from type, taken for correction of errors appearing in composition. A *first proof* is the impression taken with all the errors of workmanship. After this is corrected, another impression is printed with more care, to send to the author; this is termed a *clean proof*. When this is corrected by the author and the type has been altered accordingly, another proof is taken and carefully read over; this is called the *press proof*, or, in case the pages are to be made into electrotypes, the *foundry proof*.

In engraving, a proof is taken from time to time to show the progress of the work. Certain early impressions, usually limited in number, are known by special terms, as, 1, *Artists' proofs*, with no engraved title, sometimes signed in pencil by the painter or engraver, or both; 2, *Remarque proofs*, having some mark, frequently a minute part left white, or a design slightly engraved on the margin; 3, *Lettered proofs*, with title engraved lightly in such a manner as to be easily erased, or in open letters ready for shading, when the title is finally put on the plate for the ordinary impressions.

In the case of coins and medals, proofs are taken, as in engraving, at various stages of the work. The early proofs are usually in cheap metals, but the last proof is taken in the metal of which the coin or medal is to be made. Collectors and museums are always exceedingly anxious to obtain proofs of coins or important medals, and for this reason a number of proofs are sometimes struck. That there may be no question as to the fact of their being proofs, and not finished coins, some detail of the coin is omitted. Thus, the edge, fluted or roughened in the coin, is usually smooth in the proof.

Proof-Reading. The corrections to be made on a proof of printed matter are marked on the margin; and for this purpose various signs or

Proof-Reading

symbols have been universally adopted. The following specimen proof exhibits the application of most of these signs:

'To rule the nations with imperial
sw^y, to impose terms of peace, to ¹ a
spare the humbled, and to ² tr
proud, resigning it^{to} others to de- ³ #
scribe the courses of the ⁴ |
heavens, and
explain the rising stars; this, to use
the words of the poet of the ⁵ italic
Aeneid
in the apostrophe of Anchises to
Fabius in the Shades, ⁶ /
was regarded
as the proper province of a ⁷ sm. caps
Roman.
The genius of the people was ⁸ slet
more adverse to the cultivation of the
physical sciences than that ⁹ of
the Euro- ¹⁰ ; 1/2 tr
pean Greeks, ¹¹ w f
and [seen] we have ¹²
that the latter left experimental philosophy
chiefly in the hands of the ¹³
Asian and ¹⁴
African colonists. The elegant litera-
ture and metaphysical speculations
of Athens, her ¹⁵
histories, ¹⁶
dramas, ¹⁷
epics, ¹⁸
and orations, had a numerous host of
admirers in Italy, but a ¹⁹
feeling of ²⁰
indifference was displayed to the
practical science of Alexandria. [This
repugnance of the Roman mind at
home to mathematics and physics, ¹
extending from the Atlantic to the
Indian ²
Ocean, from Northern Britain
to the cataracts of the Nile, annihi-
lated in a measure ³
the pure sciences
in the conquered districts where they
had ⁴
had been pursued, and prohibited
attention to them in the mother ⁵
country.]
(Long, indeed, after the age of
Ptolemy, the school in connection
with which he flourished, remained
in existence; ⁶
&c.)

1, A wrong letter. After every mark of correction a line should be drawn, to prevent its being confounded with any other in the same line. 2, A word or letters to be transposed. Where letters are to be transposed they may be stricken out and rewritten in their proper sequence in the margin, like a correction, or they may be underscored, with the marginal "tr."

as in the illustration. 3, A *space* wanted. This mark is used when the spacing is insufficient. 4, A space or quadrat *sticking up*. 5, Alteration of type. One line is drawn under the word for *italics*, two for SMALL CAPITALS, three for CAPITALS. 6, Correction or insertion of marks of punctuation. 7, A word struck out, but afterward approved of (Lat. *stet*, "let it stand"). 8, A turned letter. 9, An omission. 10, A letter of a wrong font. 11, A word or letter to be deleted (Lat. *deletus*, p. p. of *delere*, to destroy). 12, Alteration of type. 13, Begin new paragraph. 14, Insertion of a clause. 15, A *space* to be removed or diminished. 16, A wrong word. 17, When letters do not line evenly at the base. 18, Mark for a hyphen. 19, Do not make a new paragraph. 20, The manner in which the apostrophe, inverted commas, the star and other references, and superior letters and figures are marked.

The immediate object of a "reader" or corrector of the proof is to observe and mark every error and oversight of the compositor, with a view to make the printed sheet a perfect copy of the author's manuscript. This is on the supposition that the manuscript itself is quite correct, which is seldom the case; and therefore the duty of a good reader extends to seeing that there are no inconsistencies in orthography, punctuation and abbreviations, and in many cases to the verification of quotations, dates and proper names. When supposed errors are discovered by the reader they should be referred to the author for verification. In case extensive alterations, omissions or additions are likely to be made by writer or editor, it is more convenient to take the proofs on long slips, before division into pages. The making of new paragraphs or the suppression of those in type should be avoided as causing trouble and expense.

The duty of securing consistency in spelling and punctuation is especially important in the case of works on which several writers are employed, such as newspapers and cyclopedias. The corrector has also to direct his attention to the numbering of the pages; to the arrangement of chapters, paragraphs and notes; to observing running titles, etc. It is part of his business to observe the mechanical defects of the work, defective types, turned letters, inequalities of spacing between words, sentences and lines, and to secure symmetry in verses, tables or mathematical operations. In almost all cases two proofs are taken, and in difficult works, such as those in

foreign languages, tables, and other special cases, even more are drawn. Lastly follows the revision, in which little more is done than seeing that the compositor has made all the corrections marked on the last proof. It is usual for the writer or author to reserve the correction of the second proof for himself.

The thankless and monotonous business of a corrector or reader is more difficult than the uninitiated would believe. It requires extensive and varied knowledge, accurate acquaintance with the art of typography, and above all, a peculiar sharpness of eye, which, without losing the sense and connection of the whole, takes in at the same time each separate word and letter.

Proportion, in mathematics, an equality of ratios, written in a variety of forms, as $\frac{2}{4} = \frac{8}{16}$, $2:4=8:16$ or $2:4::8:16$, but usually read 2 is to 4 as 8 is to 16. The first and last terms of a proportion are called its *extremes*; the second and third terms are called its *means*. The fourth term is said to be a *fourth proportional* to the first three. When the second and third terms are the same, the fourth term is said to be a *third proportional* to the others, and the middle terms are a *mean proportional* to the *extremes*. Numbers are said to be directly or simply proportional when they vary directly as each other; they are said to be inversely proportional when they vary inversely as each other, one increasing as the other decreases. The theory of proportion is sometimes known as the *rule of three*. By the application of algebraic processes to a simple proportion, combinations of the various terms are produced so that new relations between them are shown. For instance, using the proportion $\frac{a}{b} = \frac{c}{d}$,

by applying algebraic processes, such proportions as the following are produced:

$$\frac{b}{a} = \frac{d}{c}; \frac{a+b}{a} = \frac{c+d}{c}; \frac{a+b}{a-b} = \frac{c+d}{c-d}, \text{ etc.}$$

Propylaea, *pro pe le'a*, a name applied in Greek architecture to a structure outside the entrance gate or door of a sacred enclosure or other precinct. An excellent example is the propylaea at Athens, at the entrance to the Acropolis, begun in 437 B.C. by Mnesicles. It consists of a central ornamental passage with a magnificent Doric portico on each side. The principal gangway of approach is flanked by six tall Ionic columns, whose capitals supply the most beautiful types of the order. The whole is about 75 feet square, and the width across the wings is about 150 feet.

Prose, ordinary spoken or written language, not cast in poetic measure, thus distinguished from verse, or poetry. Artistic and finished prose is among the latest attainments, both of nations and individuals, and it would appear that with most nations classical prose writers are fewer than classical poets. For the various kinds of prose writings, see **FABLE**; **ESSAY**; **NOVEL**.

Proserpina or **Persephone**, in classical mythology, the daughter of Jupiter and Ceres. One day while gathering flowers in a plain in Sicily, she was surprised by the approach of a gloomy, dark-browed man in a black chariot. He sprang out, seized the maiden and returned with her to his chariot, telling her that he was the god Pluto and that he intended her for his wife. She pled in vain and was finally obliged to accept her station on the throne at the side of Pluto. Her mother, Ceres, at length discovered the whereabouts of her daughter and obtained from Jupiter his promise that she might bring Proserpina back to earth, provided the girl had eaten nothing while in Hades. When the messenger of Ceres went for Proserpina it was found that she had eaten six pomegranate seeds, and for each of these she was obliged to spend one month each year in Hades, while the other six months were passed on earth. While she was above ground the flowers bloomed and the sun shone and it was summer, while her stay in Hades was regarded as the cause of winter.

Protection, in economics, the governmental policy of conferring artificial advantages upon home producers of certain articles, either by means of bounties or (more commonly) by duties imposed on the same or similar articles introduced from abroad. Such duties may be simply *protective*, that is, of such an amount that the foreign producer can pay the duty and still compete in the market on nearly equal terms; or *prohibitory*, that is, to exclude foreign competition altogether. See **TARIFF**.

Proteids, a name given to substances similar in composition to protein, that is, consisting of carbon, hydrogen, oxygen and nitrogen, sometimes united with sulphur and phosphorus. The gluten of flour, albumin, the fibrin of the blood, the chief constituent of muscle and flesh, and casein are examples of proteids. Proteids are the essential food stuffs.

Proteins, foods composed of carbon, hydrogen, nitrogen and oxygen. The same name is given to the nitrogenous material present in the foods, which serve the purpose both of repairing and building up the body and of furnishing

heat or energy. Proteins include proteids and nonproteids, the former, or albuminoids, being the most important of the nitrogenous elements of foods.

Protesila'us, in Greek mythology, the king of Phylace, Thessaly, and son of Jason. He married Laodamia, but soon after set off for the Trojan War. He was the first of the Greeks to step on Trojan soil and was, in accordance with an ancient prophecy, the first to be slain. Laodamia, overwhelmed with grief, persuaded the gods to grant the return of Protesilaus to earth for three hours. At the end of that time, rather than be parted from him, Laodamia killed herself, and returned to the lower world with her husband.

Prot'estant Epis'copal Church. See **EPISCOPAL CHURCH**; **ENGLAND**, **CHURCH OF**.

Protestants, a name given to the party who adhered to Luther during the Reformation in 1529 and who protested, or made a solemn declaration of dissent, from a decree of the emperor Charles V and the Diet of Spires. The protesting members were the electors John of Saxony and George of Brandenburg, princes Ernest and Francis of Brunswick-Lüneburg, Philip, landgrave of Hesse, and Wolfgang, prince of Anhalt, together with fourteen imperial cities, the chief of which were Strassburg, Nuremberg, Ulm and Constance. The name is now applied generally to those Christian denominations that differ from the Church of Rome and that sprang from the Reformation.

Pro'teus, in classical mythology, a marine deity who fed the seal-flocks of Neptune in the Aegean Sea. He was represented as a soothsayer, who prophesied only when compelled by force and art, and who tried every means to elude those who consulted him, changing himself, after the manner of the sea gods, into beasts, trees and even fire and water. The name *old man of the sea* was commonly applied to him.

Protoplasm, *pro'to plaz'm*, a substance, transparent and jelly-like in appearance, the real living part of plants and animals. It is the substance of which cells are composed, and it has certain properties which prove that it possesses life. It has the power of spontaneous motion; it is irritable and responds to stimuli of various kinds; it has the power of assimilation; it can take up new material and build it into its own substance; it is capable of reproducing its kind.

Protozo'a, the lowest of the seven branches into which the animal kingdom is usually divided. All are simple, one-celled animals, usually of

microscopic size, and they are merely particles of protoplasm, which are able to move about and digest such bits of food as come within their reach. They have no organs, and their motion is really a flowing. From one side of the mass, a projection moves out, and the rest of the mass follows it (See AMOEBA). Some of the infusorians, which are a class of protozoans, have specialized forms (See VORTICELLA). Some are covered with a limy substance, which resembles that in the hard wing of the beetle. The shells of many are exceedingly beautiful in color and marvelously delicate (See FORAMINIFERA). The Protozoans are reproduced by *fission*, that is, when one divides into two, each part becomes a separate animal; or by *budding*, in which a portion of the bud becomes specialized and is eventually cast off as a separate animal, or by *spores* or *germs*, which, being cast off by the parent, live for a time a different existence from the pure protozoan. In this spore form they are able to withstand cold and drouth and are liable to be blown about from one place to another. Consequently, the protozoans are very widely distributed throughout the earth.

Protozoic Era, a division of geologic time extending from the Azoic to the Paleozoic era and including the Algonkian system. It was named from the fact that the earliest specimens of shell protozoa were discovered in its formations. See ALGONKIAN SYSTEM; ARCHAEOAN SYSTEM; GEOLOGY; PALEOZOIC ERA.

Proudhon, *pro dohN'*, PIERRE JOSEPH (1809-1865), a French socialist and political writer. At the age of nineteen he entered a printer's office, afterward became a press reader and in this way acquired considerable linguistic knowledge, with the result that he wrote an *Essai de Grammaire Générale*. As a reward for his studious labors, he had conferred on him, by the Academy of Besançon, a pension of 1500 francs for three years. Political economy now became his chief study, and in 1840 his famous work appeared, bearing on the title-page the question, "What is property?" to which the first page of the treatise contains the answer, "It is theft." For this treatise and for two others that followed, he was prosecuted at Besançon, but he was ultimately acquitted. From 1844 to 1847 he managed a system of water transport on the Rhône and Saône. He settled in Paris in 1847, started various newspapers, became a leader in the Revolution of 1848 and was elected a representative for the Seine in the Constituent Assembly. His attempt to found a People's Bank was unsuccessful;

ful; and for his outspokenness in the press he was imprisoned for three years.

Provençal, *pro vahNsal'*, **Language and Literaturé**, strictly the language and literature of that portion of southern France known as Provence, but in its widest application the Provençal language includes the form of speech belonging to the inhabitants of the whole south of France. This language was the earliest cultivated of the Romance languages (or those based on the Latin), and at one time it was extensively used in literature. Provençal, as a new and distinct language, appeared about the tenth century and continued as a medium of literary expression until about the end of the thirteenth century. In the early part of the Middle Ages, indeed, the poets of Provence were the most famous in Europe (See TROUBADOUR). In 1350 a few scholars of Toulouse attempted to revive the decaying glory of the Provençal language, and for this purpose they composed a treatise on grammar and poetry. About the middle of the fifteenth century the language ceased to be used both for administrative and literary purposes, and it has long been reduced almost to the condition of a dialect. In the present century efforts have been made to restore Provençal as a literary language, and poems of no small value have been written in the modern form of it; while a society of literary men and scholars exists for the purpose of furthering its restoration. Still Provençal is a language whose interest as a vehicle of literature is mainly in the past.

Prov'erbs, one of the canonical books of the Old Testament, usually ascribed to Solomon. According to modern Biblical critics the book of *Proverbs* is composed of several sections, written by different authors and at different times, finally collected into a single book at some period subsequent to the return from the captivity.

Providence, R. I., the capital of the state, the second city of New England and the county-seat of Providence co., is situated on Providence River, an arm of Narragansett Bay, 35 mi. from the sea, 40 mi. s. of Boston and 157 mi. n. e. of New York. It is on a number of branches of the New York, New Haven & Hartford Railroad. The city is built on both sides of the river and is bounded on the east by the Blackstone, or Seekonk River.

The site, covering about 18 square miles, is slightly hilly, the highest elevation attaining an altitude of 200 feet. Because of the pecu-

Providence

liarity of its site, the outline of the city is very irregular. The sides and summits of the hills are covered with beautiful dwellings, some of them dating from colonial times, while the business part of the city is on the lower land along the river and bay. The city contains about 46 miles of paved streets, which in the older part of the town are narrow and crooked. It has 33 public parks, whose combined area is 649 acres. The most important of these is Roger Williams Park, on the south side. This contains a statue of Roger Williams and has a fine system of boulevards, besides gardens and lakes. In front of the city hall is a soldiers' and sailors' monument, and near it is a statue of Gen. Ambrose E. Burnside.

The most important public buildings are the new state capitol, constructed of marble and granite; the Federal building, the county courthouse, the city hall, the public library, four public high schools, the Athenaeum, the Union Railway Station and a number of office buildings, including the Bannigan building, the Industrial Trust building, the Equitable building, Barton Block, Merchants' Bank and National Exchange Bank. Among the leading churches are the Roman Catholic Cathedral of Saint Peter and Saint Paul, Grace Episcopal Church, the First Universalist, the Union Congregational, the Central Congregational, the Central Baptist, the Trinity Methodist, All Saints' Memorial and Saint Stephen's Episcopal. Churches of interest because of their historical associations are the First Baptist Church, connected with Brown University; Saint John's Church, one of the oldest Episcopal churches in New England, and the Beneficent Congregational Church. The educational institutions include Brown University, occupying an elevated site on the east side (See BROWN UNIVERSITY), the Classical, Technical, Hope Street and English high schools and the Friends' School. The leading charitable and philanthropic institutions are the Butler Hospital for the Insane, the Rhode Island Hospital, Rhode Island Homeopathic Hospital, Saint Joseph's Hospital, the Dexter Asylum for the Poor and the state institution for the deaf. The Rhode Island Historical Society occupies a fine building of brick and granite and has a valuable library. In addition to this are the Providence Public Library of about 90,000 volumes, the Athenaeum Library of 62,000 volumes, the libraries of Brown University and the John Hay and John Carter Brown libraries.

Prune

Providence is one of the most important industrial centers of New England and contains a large number of manufactories. Chief among these are the manufactures of jewelry and allied industries. Closely associated with the jewelry industries is the manufacture of silverware. In both of these industries Providence ranks among the leading cities of the United States. It is also the leading city in the manufacture of files and screws, and other manufactures include worsteds, woolen goods, cotton goods, rubber goods, engines, locomotives, machinery and stoves. Dyeing and bleaching and brewing are also of considerable importance. The city has an extensive coastwise and inland trade, but its foreign commerce is not correspondingly great, because the harbor will not admit the largest ocean vessels and because of inferior docking facilities.

Providence was settled in 1636 by Roger Williams, and is noted as the first settlement in New England in which religious freedom was guaranteed the inhabitants. It was also here that the first Baptist church in America was founded. The settlement grew slowly, and at the end of the first century of its existence it numbered scarcely 4000 inhabitants. In 1676, during King Philip's War, the Indians attacked the town, burning over one-third of its houses. In 1815 part of the town was flooded during a great storm. After this, however, the place prospered, and was incorporated as a city in 1832. Its growth has been regular. Population in 1910, 224,326.

Providence Plantations. See RHODE ISLAND.

Provo City, UTAH, the county-seat of Utah co., about 45 mi. s. of Salt Lake City, on the Provo River and on the Oregon Short Line and the Rio Grande Western railroads. The city is in a farming, stock-raising and fruit-growing region, and it has canneries, flour and lumber mills and manufactories of woolen goods, roofing and other articles. Provo Cañon, Utah Lake and Bridal Veil Falls are of considerable scenic interest. The Brigham Young Academy is located here, and the city also has a state asylum for the insane, a Mormon tabernacle and the Proctor Academy. The place was settled in 1849 and the city was incorporated in 1851. Population in 1910, 8925.

Prune, a dried or preserved plum. The best prunes come from Germany and France, where they are very carefully prepared from the choicest plums and packed in fancy boxes. They are

eaten without cooking and are thought to be a great delicacy. The common prunes of the market are from southeastern Europe or from California, which now produces large quantities. These prunes require cooking to make them palatable.

Pruning, cutting portions of a plant, as stem, branches, shoots or roots, for the purpose of checking growth in one direction and assisting it in another. While the immediate effect is to reduce the growth of the plant, its final effect is to produce a larger and stronger plant. Plants are pruned for various purposes. The gardener prunes to change the form of his plant or to increase the size and brilliancy of the flowers. The nurseryman prunes to aid the plant in perfecting its fruit. Pruning should be done when the plant is in full vigor, as the wounds then heal quickly. Branches should be cut close to the part from which they are taken, and if they are large, the wound should be covered with paint or wax, to protect it from the weather.

Prussia, *prush'a*, a kingdom of Europe, the largest state of the German Empire. For geographical features, see GERMANY.

HISTORY. The historical development of the Prussian kingdom is closely associated with two important elements. The first of these is found in the growth in power of the electorate of Brandenburg, which formed the nucleus of the future kingdom of Prussia. The second is associated with the rule of the Hohenzollern family, under whose skilful diplomatic and military guidance the small electorate of Brandenburg grew into an important kingdom (See BRANDENBURG).

The Prussians were a Slavonic people, inhabiting the coast territory between the Vistula and the Niemen. Their neighbors, the Poles, endeavored to convert them to Christianity, and to this end conquered the whole country, with the aid of the Teutonic Knights (1283). As the price of their assistance, the knights claimed the conquered territory, and established themselves in castles and walled cities. Their rule was finally overturned by the combined forces of the Prussians and the Poles, and in 1466 West Prussia was ceded to Poland and East Prussia was held by the Teutonic Knights as a fief of Poland. A member of the Hohenzollern family came to power in East Prussia in 1511, and he succeeded in having the state declared a duchy, with himself as hereditary ruler. When the line of his descendants failed, in 1618, the

duchy of Prussia was added to Brandenburg, which was ruled by a member of another branch of the Hohenzollern family, John Sigismund.

John Sigismund was succeeded in 1619 by his son, George William, who proved unequal to the crisis of affairs in Germany, brought about by the Thirty Years' War. The electorate suffered severely in this struggle, and when Frederick William I, called the Great Elector, came to the throne in 1640, he found his territory occupied by a Swedish force. Frederick William may be regarded as the virtual founder of the Prussian monarchy. He made Brandenburg a military state and won for it recognition from the powers of Europe (See FREDERICK WILLIAM). The Great Elector, on his death in 1688, was succeeded by his son Frederick, who in 1701 was crowned first king of Prussia. He was succeeded by his son, Frederick William I, whose reign, which lasted until 1740, was on the whole peaceful. A war with Sweden, however, won for the new kingdom a great part of Swedish Pomerania.

Frederick II, called the Great, came to the throne on the death of his father in 1740 (See FREDERICK II, of Prussia). In less than a year after his accession he proclaimed war against Maria Theresa, in order to enforce his claim to Silesia. With varying fortunes the struggle continued until the Peace of Hubertsburg, 1763, which closed the Seven Years' War (See SUCCESSION WARS, subhead *War of the Austrian Succession*; SEVEN YEARS' WAR). The outcome of this war transformed Prussia into one of the first-rate European powers, and the first partition of Poland, which took place in 1772, greatly enlarged the country by the addition of West Prussia.

The successor of Frederick II, his nephew, Frederick William II (1786-1797), interfered in the affairs of France on behalf of Louis XVI, and in consequence he was forced to give up the territory which Prussia had possessed west of the Rhine. A second and a third partition of Poland brought to Prussia considerable accession of territory. Frederick William III, who succeeded to the throne in 1797, attempted at first to remain neutral in the general European struggle against Napoleon. This attitude, however, ultimately led to distrust among the German states, and the formation by the other states of the Confederation of the Rhine left Prussia at the mercy of Napoleon. When in 1806 Frederick William found himself driven into the struggle against France, the result was

Prussic Acid

complete defeat at Jena and Auerstädt. By the Peace of Tilsit (1807), the country was deprived of all lands between the Rhine and the Elbe.

The years which followed were marked in Prussia by sweeping internal reforms, which the crisis necessitated and which were efficiently carried out under Stein, Hardenberg and Scharnhorst. Owing to these reforms, which amounted almost to a revolution, Prussia was able, after Napoleon's disastrous Russian campaign of 1812, to take an important part in the final struggle for his overthrow. At the Congress of Vienna in 1815 Prussia was deprived of some of her possessions, but was recompensed with others which were of more value to her. She also formed one of the states of the German Confederation.

After the restoration of peace, Frédéric William III was guided by the councils of Metternich and the Holy Alliance, and he entered upon a reactionary policy, which continued until his death in 1840. Frederick William IV, who succeeded him, tried in 1847 to anticipate the revolutionary movement, which he saw to be imminent, by summoning a general legislative assembly. No real power, however, was conferred on this parliament, and in the following year the king was forced to dismiss his ministers and grant a constitution. In 1849 the imperial crown was offered to Frederick William, but he refused it, and thus he lost the opportunity of placing himself at the head of a united Germany. For the further history of Prussia and the union of the German states under her leadership, see GERMANY, subhead *History*.

Prus'sic Acid or **Hydrocyanic Acid**, an acid discovered by Scheele in 1782, but first prepared in the pure state by Gay-Lussac in 1811. It is a colorless liquid which solidifies at 5° F. to feathery crystals, and which boils at 80°. It dissolves in all proportions in water, forming a liquid which reddens litmus paper but slightly. It is found in the kernels of bitter almonds, peaches, apricots, plums, cherries and quinces; in the blossoms of peaches and aloes; in the leaves of beech, cherry and laurel, and in various parts of other plants. Pure prussic acid is prepared by passing a stream of dry sulphureted hydrogen over dry cyanide of mercury. This acid, which is one of the strongest poisons known, is used medicinally to remove various forms of irritation; but in all cases it must be used with extreme caution. When an overdose

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is administered, death is instantaneous, and with a lesser dose the symptoms are convulsions or paralysis. The nature of its action is not clearly understood, but the best antidotes are found to be ammonia, chlorine water or a subcutaneous injection of atropine.

Pruth, *proot*, a river of Europe which rises in the Carpathian Mountains, flows east and then southeast, forming part of the boundary between Rumania and Russia, and joins the Danube about 75 miles from the Black Sea. Its length is about 500 miles.

Psalms, *sahmz*, **BOOK OF**, one of the books of the Old Testament, containing the collection of hymns used by the Jews in the temple service. Each psalm, with a few exceptions, has a particular superscription, such as *Maschil*, instruction, or *Michtam*, memorial. The chronology of the psalms is much disputed. The earliest is said to have been written by Moses, many are attributed to David, a few are supposed to have been written on the return from the captivity, and some in the time of the Maccabees.

Psyche, *si'ke*, in classical mythology, the wife of Cupid. She was so beautiful that she was worshiped by mortals as Venus, and that goddess, becoming jealous, instructed her son Cupid to kill the maiden or to cause her to fall in love with some ugly wretch. Cupid, however, on seeing her promptly fell in love with her himself. He visited her only after dark and instructed her that if she ever made any attempt to find out who he was or to see him in the light, he should be obliged to leave her forever. One night Psyche, spurred on by her jealous sisters, lighted a lamp and held it over Cupid while he slept. In her surprise and joy at her husband's appearance, she gave a start, so that a drop of burning oil fell from her lamp upon Cupid's shoulder and wakened him. He immediately disappeared, and Psyche was forlorn. She entered, shortly after, the service of Venus, hoping thus to win her good will, and was obliged to perform many very difficult tasks. At length, however, Cupid again encountered her and was so enraptured with her beauty that he took her with him to Olympus and petitioned Jupiter to make her immortal. Even Venus was reconciled to the beautiful girl and allowed her son to keep her as his wife. As Cupid was the personification of the heart, so Psyche represented to the ancient Greeks the soul.

Psychology, *si kol'o jy*, the science of mind. There are nearly as many definitions of psychology as there have been writers upon the subject,

but in the final analysis, all of these reduce to the definition here given. Psychology treats of the activities and powers of the mind. It is concerned with psychical facts, mental phenomena, or whatever they may be called. The problem, What is mind? belongs to the realm of philosophy. Psychology considers not only mental phenomena, as such, but also their conditions; the order of their development, and the circumstances by which that development is influenced. In the consideration of these conditions, one of the first and most important facts with which the student of psychology comes in contact is the intimate relation of mind and body. The recognition of this fact and its importance have led to the study of psychology from the physiological point of view by nearly all psychologists of modern times. While the relation between the activities of the mind and physiological processes is very close, it must be remembered that physiological processes cannot be changed into mental activities, and that however closely related mind and body may be, an impassable barrier is fixed between them.

ACTIVITIES OF THE MIND. *Consciousness.* The state of mind in which it is aware of its own acts is called consciousness; that is, consciousness may be considered as the mental state which distinguishes a person awake from one asleep. Consciousness makes us aware of every act of knowledge. One not only knows that a thing is thus and so, but he *knows* that he knows it. *Self-consciousness* is the state of mind in which the attention centers upon one's mental activities. It may be voluntary, as when one purposely studies his mental activities to discover the order in which they follow each other, the influence of one upon another or the influence of external conditions upon them all; or it may be involuntary, as when a child or an adult, in performing some act to which he is not accustomed, becomes painfully aware of his actions. This sort of self-consciousness usually leads to embarrassment. One is always in a state of consciousness while awake, but he is not necessarily self-conscious. Under ordinary conditions of consciousness, the attention is centered on the result of the mental activity, not on the processes by which that result is obtained. In writing a letter, playing upon a musical instrument or performing any other act to which one is accustomed, he is aware only of the results produced.

Phases of Mental Activity. Activities of the mind are characterized by three phases, knowing, feeling and willing. Psychologists are di-

vided in opinion as to which phase, knowing or feeling, is first in consciousness; hence, we find some authorities stating that feeling is dependent upon knowing, and others asserting that knowing depends upon feeling. Knowing is the result of attention, and attention is an act of will; but in order that the attention may be fixed upon any object, that object, whether of sense or of thought, must have some value for the mind; that is, the mind must entertain a desire to know something about the object, and this desire causes the will to direct the activities of the mind or center the attention upon it. The desire is feeling, but it is of little importance to know whether knowing or feeling takes precedence. While, for the purpose of treatment, these three phases of activity must be considered separately, it should be remembered that the mind is a unit which cannot be analyzed into parts, and that all phases of self-activity are present in every mental state.

Knowing. Every activity of the mind may be considered as giving us knowledge, since it has reference to some object of sense or of thought, as a house already in existence, a mathematical theory to be developed, or the illness of a friend. The ideas arising from our mental activities become a part of the content of the mind and modify our mental life to a greater or less extent, according to their nature and importance. Ideas are acquired through two sources, the special senses and the reaction of the mental activities upon each other. The senses give us ideas of the external world, and the working of the mental powers gives us those ideas produced by thought, such as scientific treatises, resolutions affecting our lives and theories of government. However, the mind is awakened to activity by its reaction upon the impressions brought through the senses (See SENSATION).

The effect produced through the action of an organ of sense upon the brain is a *sensation*. When we are conscious of the sensation, the mind reacts upon it and the result is an idea. An orange is placed in view of a child; the image of the orange is formed upon the retina of the eye, where it excites the sensitive organs of the optic nerve; the excitation conveys the impression to the optical centers, which react upon it, and the child gets an idea of the size, form and color of the orange. The idea is complex and separable into three ideas, of form, of color and of size. If the child places his hand upon the point of a tack or a pin, the proper brain centers are excited through a different set of nerves, and he gets the

idea of pain. Again, he may listen to a song or story by which he is moved to laughter or pity or led to construct beautiful pictures of the people and scenes described. In each instance the ideas obtained are added to those already in the mind. For a fuller description of the processes by which ideas are obtained, see, in the order named, SENSATION; PERCEPTION; APPERCEPTION; CONCEPT.

Feeling. Every idea appeals to the individual with more or less force, that is, it has its own particular value. To the extent of its value it arouses the feelings or, as we usually express it, awakens within us an interest. Some ideas are much stronger than others. In the case of the child, the pain caused by the injury from the tack will arouse his feelings to a higher degree of activity than the impressions made by the orange or the story. The feeling is given definiteness through the idea with which it is associated, so that whether or not feelings constitute the first phase of mental activity, through *knowing* they are given definite form and value, and the feeling is always associated with the idea (See FEELING).

Willing. Willing is related to both knowing and feeling. Attention is the first essential to knowing, and we have already stated that attention is an act of the will. Furthermore, willing may be considered as the action or the motor element accompanying the idea. The knowledge of the orange may arouse the child to a desire to obtain it, and this will lead to whatever action is necessary to secure the fruit. This action includes: (a) decision, a mental act; (b) execution, or carrying the decision into effect. See INTEREST; WILL.

The three phases of activity are not present in every idea in equal proportion, and for this reason they are considered by some authorities to be antagonistic; but the antagonism consists merely in one phase becoming so prominent as to overshadow the others. Intense feeling or intense action suppresses the knowing phase of activity and is seldom accompanied by clear ideas; on the other hand, when the knowing phase is most active, it is accompanied by a moderate degree of feeling, and the willing is confined to concentrating the mental powers upon the object under consideration.

DEVELOPMENT OF MENTAL POWERS. The development of the mental powers keeps pace with the growth of the physical organism. This development is along the following lines: (1) Operations which were at first difficult and slow

become increasingly easy and more rapid from repetition (See HABIT). (2) New operations of an equal degree of difficulty grow easier; the powers of observation become keener and more comprehensive; the memory retains more readily and recalls past impressions with a greater degree of ease; thought becomes more mature, and the judgment more accurate. (3) Ability is acquired to execute more complex and difficult operations. The man is capable of making nicer distinctions and broader classifications than the child; he also possesses a power of analysis which enables him to solve intricate problems, discover new laws and formulate theories. Our systems of jurisprudence, government, sociology, theology and many institutions which affect society are the result of the exercise of these powers by the ablest minds.

The mental powers do not all develop equally at the same time. The early period of life is spent in gaining knowledge of the external world, and those powers by which the mind becomes acquainted with its environment are at this time the most active. These are the powers of sensation, perception and memory. During the first ten or twelve years of the child's life the senses are keen, and they should be trained, not only to observe broadly, but also to make nice distinctions. During this period the memory is especially active.

The ideas acquired react upon the mind, and the child is continually comparing and classifying, at first roughly, and then with greater discrimination. As the mental powers mature, the thinking power becomes active, along with the memory, and this brings into play the constructive power of the imagination, by means of which the child builds many curious things from the material at his disposal and constructs wonderful castles in the air. See CONCEPT; IMAGINATION.

The feelings and the will develop along with the so-called intellectual powers. At first the feelings are not under control; the child abandons himself to his joys and sorrows without restraint. Gradually the will begins to assert itself, and the emotions become less violent. They are also directed so that they assist the perception, memory and other intellectual powers. The child is intensely interested in his surroundings, and for this reason the ideas gained during his early years remain with him through life. The development of feelings, like that of the intellectual powers, is along the lines of finer discrimination and broader application. As one's knowledge

Ptarmigan

is extended, one's sympathies are broadened and one's likes and dislikes are modified.

The will gains in strength and pliability and extends its control over all other mental powers. Its activities are complex, and it seldom reaches its highest culture before adult life and in many cases not until later (See WILL).

The development of the brain continues until the twentieth year; after that age it is generally considered that this organ is less pliable, and it is more difficult to obtain entirely new ideas. As one grows older, one's views and habits of life become still more definitely fixed, and whatever knowledge one gains is modified by that already in the mind. From this it follows that early training is of the greatest importance. While the mental powers are active through life, we rely upon some at one period and upon others at another. The child relies more upon his powers of observation; the man, more upon reason and judgment. The child reproduces past events by memory; the man often arrives at the same result by a course of reasoning. The more complex activities, such as reason and judgment, depend upon the simpler activities, observation and memory. Therefore, unless these simpler activities are brought to a high degree of perfection at the proper period in life, reason and judgment can never reach their fullest development.

In addition to the articles already named, see MEMORY; REASON; EDUCATION; EDUCATION, HISTORY OF; PEDAGOGICS; METHODS OF TEACHING. Consult Halleck's *Psychology and Psychic Culture* and *Education of the Central Nervous System*, Tracy's *Psychology of Childhood*, Sully's *Outlines of Psychology*, James's *Psychology* (briefer course), Dewey's *Psychology* and Baldwin's *Mental Development*.

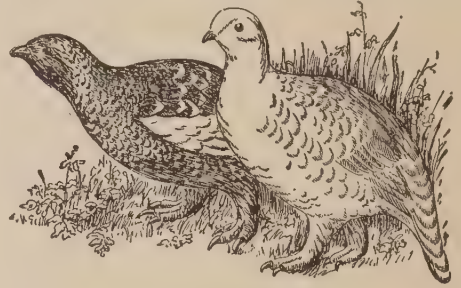
Ptarmigan, *tahr'mi gan*, a bird of the grouse family, distinguished from the true grouse by its feathered toes. In winter the plumage of most species becomes white, and even in summer much of it remains so. The ptarmigans live in the northern regions of both hemispheres and find their living among the lichens, mosses and stunted plants that grow on the rocks and in the snow. Several species are known, all of which run rapidly and fly without making the whirring noise of the true grouse.

Pteridophytes, *ter'id o fites*, the highest of the four orders into which the non-flowering plants are divided. Included among these are the ferns, scouring rushes and club mosses. In many respects they resemble flowering plants.

Pterodactyl

They have real roots, and although they do not possess a stem, the rootstock frequently resembles one and rises to a height of many feet.

Pterodactyl, *ter o dak'til*, (winged finger), a genus of extinct flying reptiles, found in the Jura



PTARMIGANS
Summer and winter plumage

Limestone formations, in some sections of Europe. The pterodactyls had a moderately long neck and a large head. The jaws were armed with equal and pointed teeth; most of the bones, like those of birds, were hollow and filled with air; but the chief characteristic con-



SKELETON OF PTERODACTYL

sisted in the excessive elongation of the little finger of the fore foot, which served to support a flying membrane, forming a wing somewhat resembling the wing of a bat. A number of species have been discovered, most of them small or of moderate size, but one must have had an expanse of wing of at least twenty feet.

Ptolemy

Ptolemy, *tol'e my*, the name of a line of kings, who succeeded, on the division of the empire of Alexander the Great, to the portion of his dominions of which Egypt was the head. **PTOLEMY I** (called *Soter*, the Savior) was by birth a Macedonian. On the death of Alexander he secured for himself the government of Egypt and made Alexandria a center of Greek culture. He was a great patron of art, learning and literature and founded the celebrated Alexandrian library. The lighthouse on the island of Pharos was also built during his rule. **PTOLEMY II** succeeded his father and reigned in almost complete peace. His chief care as ruler was directed to the internal administration of his kingdom. **PTOLEMY III** (surnamed *Euergetes*, the benefactor) brought Egypt to a very high point of prosperity. He was not only a conqueror, but also, like his predecessors, a patron of learning. **PTOLEMY V** was less than five years old at his father's death, and this led Philip of Macedon and Antiochus III of Syria to combine to dispossess Ptolemy and divide his dominions. To avert this danger the guardians of the young king placed him under the protection of Rome, which thus had first an occasion for interfering in the affairs of Egypt. During the reigns of the succeeding Ptolemies the influence of the Romans in Egypt gradually increased, with a corresponding decrease in the independence of the native sovereigns. **PTOLEMY XIV** reigned jointly with his sister Cleopatra till 48 B. C., when Cleopatra was expelled, raised an army in Syria and invaded Egypt. On the arrival of Caesar, Cleopatra by her charms acquired an ascendancy over him. Ptolemy put himself at the head of the insurgents, was defeated by Caesar and was drowned in attempting to make his escape. **PTOLEMY XV** was then declared king by Caesar, in conjunction with his sister Cleopatra.

Ptolemy, a famous author who lived at Alexandria in the second century after Christ. Little is known of his life, but he left a work on astronomy and another on geography. The latter was the standard for geography until the discoveries of the fifteenth and sixteenth centuries. The former contained all that was known of astronomy at that time and formed the basis of all astronomy until the beginning of the sixteenth century. During the Middle Ages the book was lost, but was found in an Arabic translation. According to the Ptolemaic system, the earth is a globe and the center of everything. Around it revolves the hollow

Pueblo

sphere of the heavens, so large that in comparison with it the earth is but as the point of a pin. The moon and the sun revolve around the earth, but in circles of which the earth is not the center. There were seven planets, arranged according to distance from the earth in this order: the Moon, Mercury, Venus, the Sun, Mars, Jupiter, Saturn. See **COPERNICUS**; **PLANET**.

Ptomaine, *to'mayn*, the name given to poisonous substances that are formed by the decay of animal matter after death. See **PUTREFACTION**.

Public Health Acts. See **HEALTH**, **BOARDS OF**.

Public Lands. See **LANDS**, **PUBLIC**.

Public Schools. See **COMMON SCHOOLS**.

Puck, the name given to an elf or fairy that plays an important part in English folklore. He is noted especially for his mischievous conduct, but he also has the power to bestow small favors upon those who propitiate him by kindness and presents. The name has come to be a general term to describe all fairies. Puck was introduced by Shakespeare in his *Midsummer Night's Dream*. He is sometimes identified with Robin Goodfellow.

Pudding, *pood'ing*, **Stone**. See **CONGLOMERATE**.

Puebla, *pwa'bla*, or **Puebla de Zaragoza** (formerly La Puebla de los Angeles), a city of Mexico, capital of the State of Puebla, on a plateau 63 mi. e. s. e. of the City of Mexico. It has wide streets, spacious squares and well-built houses. The cathedral is magnificent, and there are a number of other beautiful churches. There are also several colleges, a museum and a theater. Puebla is one of the chief seats of Mexican manufacturing industry, and its principal products are cotton and woolen goods, glass, leather, earthenware, straw hats and paper. The city was built by the Spaniards about 1530. During the Mexican War the United States troops held the town for some time. Population in 1910, 101,214.

Pueblo, *pueb'lo*, a name given originally to the villages of certain indian tribes that lived in the dry regions of Arizona, New Mexico and Mexico. Now the name is applied to the indians themselves. At the time of the Spanish discovery there were probably 30,000 of these indians, though for many years, with little change, the number has been about 10,000. The ruins still to be seen in various parts of the southwest show that these indians at different times wandered about, abandoning one location and

settling in another, for reasons of which we know nothing. Their houses are clustered tightly together, one frequently overlapping and rising above another. Narrow and crooked alleys separate the buildings into irregular blocks. There are no openings in the walls of the lower stories, except the narrowest of window slits, but the upper stories had both doors and windows. The indians entered through the roof, to which they gained access by movable ladders, which were drawn up at night. The whole village worked together on enterprises of general interest, such as the construction of irrigating ditches, but each family lived in many respects an independent life. They subsisted principally by agriculture and had carried the art of weaving farther than any other indians, while their pottery was among the very best. Most of the work was done by the women, as was customary in other tribes. The men were gayly clothed with robes and jackets, elaborately decorated with tassels and fringes. Their stockings and sandals were woven, and in times of war the men carried firmly woven shields and wore armor made from fibrous plants and thickly padded with cotton. Physically, these Indians are small in stature. The Pueblo do not all speak the same language, and of the numerous tribes the Zuni is the most important. See ZUNI; MOKI.

Pueblo, COLO., the county-seat of Pueblo co., 122 mi. s. by e. of Denver, on the Arkansas River, at the mouth of Fountain Creek, and on the Atchison, Topeka & Santa Fé, the Chicago, Rock Island & Pacific, the Missouri Pacific, the Colorado & Southern and the Denver & Rio Grande railroads. The city is near the eastern foothills of the Rocky Mountains, has an elevation of over 4600 feet, lies on both sides of the Arkansas River and is in the immediate vicinity of extensive deposits of coal, oil and limestone. Although located in a rapidly developing agricultural region, it owes its prosperity mainly to its manufacturing and smelting interests. Its smelters treat gold, silver, copper, lead and zinc ores, while its immense steel plant, railroad shops, foundries, machine shops and other factories make it the principal manufacturing city of the Rocky Mountain region. The state asylum for the insane is located here, as is also the large hospital of the Colorado Fuel and Iron Company and several hospitals and sanitariums of lesser note. Other important institutions are the Loretto Academy, the McClellan Library (in a fine Carnegie building)

and the law library. Of Pueblo's numerous parks, the most important are Mineral Palace Park, which takes its name from the Mineral Palace, originally designed as a museum of mineralogy, and City Park, noted for the great variety of trees it contains. There is a separate system of public schools for each side of the river, each maintaining a well-equipped high school. The business streets are well paved; the city owns its waterworks and is supplied by private corporations with electric lights, trolley cars and both illuminating and fuel gas.

The Mormons located here temporarily in 1846 and a trading post was established in 1850, but the traders were massacred by the indians in 1854. The city was laid out in 1859 and secured its charter in 1873. The city has had a steady and substantial growth. Population in 1910, 44,395.

Puerto Principe, *pwair'to preen'the pay*, a town of Cuba, capital of the Province of Puerto Principe, situated about 300 mi. s. e. of Havana, with which it is connected by rail. It is antiquated in appearance, has narrow, crooked streets and old houses. The region about the city is a cattle-raising country, and the chief industries of the city are connected with cattle raising. Cigars are also manufactured. Under the Spaniards,



PUFFIN

Puerto Principe was a military post of importance and was well fortified. The territory immediately surrounding the city was one of the centers of insurgent operations during the revolution. Population in 1911, 28,000.

Puff Adder. See ADDER.

Puffball

Puff'ball, a ball-like fungus, which grows close to the ground. When mature it is filled with minute brown spores, which are puffed out in smoke-like clouds from an opening at the top, if the ball is pressed. See MUSHROOMS.

Puff'in, a marine diving bird, that lives in the Antarctic and north temperate region on both sides of the Atlantic. It is one of the auks and is remarkable for its large, compressed bill, that in the breeding season is red, with blue and yellow markings. Curious projections appear at the same time around the bill and near the eye. The bird has a white breast, a gray face and black back and collar. Puffins breed in colonies upon rocks and in holes in the ground near the sea, each female laying one white egg. (See illustration on preceding page.)

Pug, a small dog, distinguished by a stout body and a short nose, which is usually wrinkled. The hair is short and smooth, usually of a fawn color, and the nose is black. The pug is supposed to have been introduced into England from Holland and has been a household pet for several centuries.

Puget, pu'jet, Sound, a branch of the Pacific Ocean which indents the northwestern coast of the United States. It is an inland extension of the straits of Georgia and Juan de Fuca, which separate the island of Vancouver from the mainland. The sound extends southward for about 100 miles and is divided into two branches, known as Hood's Canal, the western branch,



and Admiralty Inlet, the eastern branch. The depth of water is from 180 to over 925 feet. There are no obstructions to the entrance of the

Pulley

sound, and it forms one of the largest inland harbors in the world. On its shores are Seattle, Tacoma and Port Townsend, each of which has extensive ocean traffic. See SEATTLE; TACOMA; WASHINGTON (State).

Pulaski, poo lahs'ke, CASIMIR (Polish, PU-LAWSKI, KASIMIERZ) (1748-1779), a Polish soldier, born in Podolia, Poland, the son of a nobleman. He fought gallantly in Poland's war for freedom against Russia and was exiled for alleged connection with a plot to abduct King Stanislas in 1771. His estates being confiscated, he began an adventurous career in Turkey and France and finally went to America, where he arrived in 1777. He offered his services in the Revolutionary cause, fought at the Battle of the Brandywine as chief of dragoons and was made brigadier general in the Continental Army. At the head of an independent force of cavalry and light infantry, known as Pulaski's Legion, he served in the southern campaign, but was mortally wounded in a furious assault upon the city of Savannah, October 9, 1779.

Pu'ltzer, JOSEPH (1847-1911), an American journalist, born in Budapest, Hungary. In 1864 he came to America, served for a time in the Union armies and began his journalistic career on the *Westliche Post*, in Saint Louis, under Carl Schurz. He later became editor and proprietor of the paper. He was elected to the Missouri legislature in 1869 and was a delegate to the Liberal Republican convention in 1872. Thereafter he became a Democrat, and in 1884 he was elected a member of Congress, but served only a few months. He founded the *Saint Louis Post-Dispatch* (combining the *Post* and *Dispatch*) in 1878, and he purchased the *New York World* in 1883. In 1903 he endowed a school of journalism at Columbia University.

Pu'ley, a small wheel, turning upon an axis. The rim may be flat or grooved, according to the use to which the pulley is to be put. The frame in which the pulley is suspended is known as the block. Pulleys are of two classes, fixed and movable. The *fixed* pulley is one which does not change its position and is used simply for the purpose of changing the direction of the force applied. A *movable* pulley is one fixed in a movable block, which rises and falls with a weight. The law of equilibrium is that the weight is equal to the power, multiplied by twice the number of movable pulleys. In the single pulley, shown in Fig. 1, there is no advantage. The lever arms r and R being equal, the point B is the same distance from C , the point of support,

as the point *A*. Therefore, the power *P* must equal the weight *W*, when they are in equilibrium. In the movable pulley, Fig. 2, the weight *W*, is suspended by two cords, each of which sustains one-half of it; hence, if the power, *P*, is one-half the weight, the pulley is in equilibrium. Pulleys

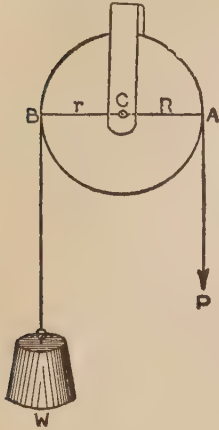


FIG. 1

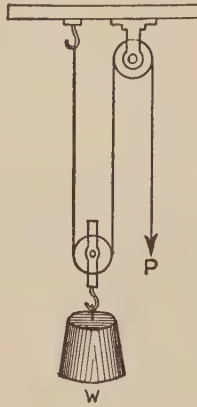


FIG. 2

are used in derricks and tackle blocks. In machinery the term *pulley* is applied to a wheel with a broad, nearly flat, face, used for carrying a belt which imparts motion to machinery.

Pull'man, GEORGE MORTIMER (1831-1897), an American capitalist, born in Chautauqua County, N. Y. At twenty-two he contracted for removing warehouses on the Erie canal. Six years later, in Chicago, he became a building contractor and raised entire blocks of brick and stone buildings. In 1859 he made his first sleeping car, now developed into the car known all over the world—especially adapted for sleeping apartments or as a drawing room or dining car. The industrial town of Pullman was founded by him. See RAILROAD, subhead *Equipment*.

Pulque, *pull'ka*, or **Octli**, a favorite drink in Mexico and Central America, made from the juice of various species of agave, pleasant and harmless until after protracted fermentation, when it becomes intoxicating.

Pulse, **THE**, the wave movement of the blood through the arterial system. The movement begins in the heart, with the contraction of the ventricle which sends a volume of blood into the aorta, which is already full. The expansions of the walls of the aorta and their contraction as the blood moves on makes the intermittent flow, which is easily felt in the radial artery of the wrist, in the temporal artery of the temples and in the carotids of the neck. Any cause which

affects the action of the heart affects also the pulse. In healthy adults the number of beats per minute varies from sixty-five to seventy-five, the most common rate being seventy-two. The pulse is quicker in children than in adults and slower in old age than in middle life. There is no pulse in the capillaries and veins. See SPHYGMOGRAPH.

Pulse Family. See LEGUMINOSAE.

Pultowa, *pul to'va* See CHARLES XII, of Sweden.

Pu'ma, one of the largest of cats, wild in the western hemisphere. The adult is about six feet long and weighs two hundred pounds, though there are variations in size. It is usually reddish-brown above, white on the throat, breast and insides of legs, black on the tip of the tail and muzzle and with a black stripe along the back. It is widely distributed over the western continent and has been given the name of *cougar*, *panther*, *American lion* and *catamount*. It lives in trees and was formerly much dreaded for its supposed habit of springing upon travelers unawares, from the branches of the trees. The food consists of large and small mammals, as deer and cattle.

Pumice, *pum'is*, a volcanic rock of various colors, gray, white, reddish brown or black, composed chiefly of glass. It is hard, rough and porous; it is lighter than water and resembles the slag produced in an iron furnace. Pumice is really a loose, spongy, froth-like lava. It is used for polishing ivory, wood, marble, metals and glass; also, for smoothing the surfaces of skins and parchment.

Pump, a device for raising liquids or removing gas from a closed vessel. The necessary parts of a pump are the barrel, the piston, the piston rod, the valves and the suction pipe. There are numerous patterns of pumps, but these can all be grouped under the following classes: suction pumps, including lift pumps and force pumps, and centrifugal pumps.

THE SUCTION PUMP. This is the common household pump. It consists of a piston fitted to work air-tight in the barrel, and containing a valve opening upward. It is connected by a piston rod with the handle, by which it is moved up and down. At the bottom of the barrel is another valve, also opening upward and closing the upper end of the suction tube. When the piston moves downward, the air in the barrel is forced up through the valve in the piston. As the piston rises, the pressure of the air closes this valve, and a partial vacuum is produced in the

Pumpkin

barrel. The water is forced upward in the suction pipe by the pressure of the air upon its surface in the cistern or well. The first few strokes of the pump exhaust the air from the barrel and the suction tube. As the air is exhausted the water continues to rise until it reaches the barrel. It is then pumped out in the same manner that the air was exhausted. Under the most perfect conditions this pump cannot raise water over 28 or 30 feet, and it will seldom work satisfactorily for more than 24 feet.

The *lift* pump also has two valves and a piston above, opening upward, but it differs from the suction pump in being placed in the bottom of the cistern or well from which the water is to be raised, and in its ability to raise water to any desired height, while the efficiency of the suction pump is limited by the pressure of the air.

The *force* pump has no valve in the piston, but it has a valve opening outward at the point where the delivery tube is attached to the barrel. Most force pumps are double-acting—that is, they have two pistons—and the water is forced from the pump into an air chamber, from which the elasticity of the compressed air draws it in a continuous stream.

CENTRIFUGAL PUMPS are employed where the lift is not too great and the quantity of water is considerable. The common form consists of a wheel, shaped like an ordinary fan, with passages leading from its center to its circumference. This is made to rotate very rapidly in the casing. The circumference communicates with the delivery pipe, and the center connects with the pipe leading to the water which is in the pump. The rapid revolution which is in the wheel causes the water to flow from its center to its circumference, and in this way sucks the water up to the center of the wheel, from which it is carried to the circumference and thence out through the tube.

Pump'kin, a climbing plant and its fruit, a native of India, but at present cultivated in America and most parts of Europe. The fruit, which is of a reddish or golden yellow, sometimes acquires a diameter of two feet. The New England pumpkin is a favorite material for pies.

Punctuation, the art of employing signs by which any writing or composition is separated, as the sense requires, into sentences and parts of sentences. Its primary object is to promote clearness of expression. There are no punctuation marks in the old Greek and Roman manuscripts; even the words are not separated. This running of all the words together makes them

Pure Food Laws

very difficult to read. First of all, authors began to correct this by separating the words, either by spaces or by dots. Next, they learned to place a full stop after sentences. But it was not until the beginning of the sixteenth century that a real system of punctuation had been devised; and our present marks are in a great degree due to the wisdom and invention of Aldus Manutius, a Venetian, who died in 1515. The principal marks of punctuation used at present are the period (.), the colon (:), the semicolon (;), the comma (,), the interrogation point (?), the exclamation mark (!), the dash (—), and the parentheses ().

Punic Wars, the name given to three great wars waged between Rome and Carthage. The first lasted from 264 to 241 B. C., the second from 218 to 201 B. C., and the third from 149 to 146 B. C. In all three of these struggles the Romans were victorious, and at the close of the last, Carthage was destroyed, thus allowing Rome unquestioned supremacy. See CARTHAGE; HAMILCAR BARCA; HANNIBAL; REGULUS, MARCUS ATTILIUS; SCIPIO.

Punjab, *pun jahb'*, a province occupying the northwestern part of British India, under the administration of a lieutenant governor. The area is 133,741 sq. mi., 36,532 sq. mi. being under the control of native rulers, who, however, are subject to British authorities. The name means "five rivers," and it is taken from the five important streams which flow through the province. For surface, climate and products, see INDIA.

Purdue' University, a state institution of higher learning, established at Lafayette, Ind., in 1869. The university is really an institute of technology and comprises schools of mechanical, civil and electrical engineering, agricultural science and pharmacy. All students are required to spend an average of three hours a day in laboratory, shop or field. The faculty numbers 180, and there are about 2100 students.

Pure Food Laws are laws intended to safeguard the purity of drugs and foods. To mix unwholesome substances in anything intended for food is an offense against the law. Most states, in furtherance of public health, prohibit by statute the sale of adulterated or misbranded foods and drugs, and Congress enacted a federal pure food law in 1906.

In general terms, products are considered adulterated if unhealthful ingredients have been added or wholesome ingredients generally used withheld; if they do not attain a certain recognized standard of purity and strength, or if pre-

pared from unwholesome ingredients, or by the employment of unsanitary methods; if, to prevent decay, noxious means and preservatives are used; or if such products constitute an imitation of some other commodity. Products are regarded as misbranded if the labels on the packages or cans convey misleading information.

In the enforcement of the federal law, questions requiring the most painstaking investigation are constantly rising. The most celebrated one concerned the use of benzoate of soda as a preservative. Dr. H. W. Wiley, chief chemist of the Department of Agriculture, decided it was a noxious preservative, and its use as such was forbidden, but the board of experts to whom the question was referred reversed this decision. The unique feature of the experiments made in this case was the employment of "poison squads" composed of volunteers, who for some months were furnished meals, in the preparation of which benzoate of soda had been used.

Pur'gatory, a place of punishment or purgation, where, according to the belief of Roman Catholics and others, the souls of those dying penitent are purified from pardonable sins. The final salvation of those in purgatory is assured, so it is not a place of probation. Those dying impenitent are not received there. It is believed that the souls in purgatory receive repose and relief from suffering through the prayers of the faithful on earth.

Pu'ritans, a name first given about 1564 to those who wished to reform the Church of England. Queen Elizabeth, though upholding the national Church, had retained many of the ceremonies and vestments of the older worship and had thus antagonized a large part of the Protestant party, who wished to have the Anglican Church differ more decidedly from the Catholic Church. At the close of her reign, the Puritans were of three classes—those who desired a changed worship but wished to remain in the Church: those who wished to adopt Calvinism as the Established Church, and those who did not believe in the Established Church, but thought that each congregation should govern itself. These were led first by Robert Brown and were known as Brownists, but later were more generally called Separatists or Independents. The Puritans gained in strength in the reigns of James I and Charles I, in spite of great efforts to overthrow them, and they took the leading part in the Civil War, which resulted in the establishment of the Commonwealth. With the restoration of the Stuarts in 1660, the

Act of Uniformity placed the Puritans in the position of dissenters, and many emigrated to America, whither a large number of their comrades had already gone as early as 1620. Plymouth and Massachusetts Bay, New Haven and Connecticut were in reality Puritan commonwealths until early in the eighteenth century, when religious liberty was allowed. The Puritans in America eventually divided into numerous sects, of which the Presbyterians (Calvanists), the Congregationalists (Independents) and the Baptists became the most important.

Put'nam, CONN., one of the county-seats of Windham co., 45 mi. n. e. of Hartford, on the Quinebaug River and on two lines of the New York, New Haven & Hartford railroad. The city is in an agricultural region and contains iron works, cotton, woolen and silk mills, boot, shoe and other factories. It has the Day-Kimball Hospital, Saint Mary's Convent, Notre Dame Academy and a public library. The picturesque Cargill Falls in the vicinity are of interest. Putnam was settled in 1855 and was chartered as a city in 1895. Population in 1910, 6637.

Putnam, ISRAEL (1718-1790), an American soldier, born at Old Salem Village, Mass. When the French and Indian War broke out he joined the army and rendered good service throughout the war. He was taken prisoner by the French and fell into the hands of the Indians, who tortured him cruelly. In the disturbances which led up to the Revolutionary War, Putnam showed himself a most determined opponent of British aggressions, and when the war broke out he joined the army. He was present at Bunker Hill and later destroyed much British shipping on the expedition to Noddle's Island. In 1775 he was in command of the army at Long Island, and in the following year he took part with Washington in the New Jersey campaign, fighting in the Battle of Princeton. His evacuation of two forts in 1777 led to his removal from command, but he was acquitted by the commission appointed to examine him and was given his former rank.

Putnam, RUFUS (1738-1824), an American soldier and frontiersman, born at Sutton, Mass. He fought in the last French and Indian war, served in the American army during the Revolution, part of the time as an engineer and part in active military service, and at the close of the war he was made a brigadier general in the American army. In 1786 he organized, with Benjamin Tucker, Manasseh Cutler and others,

a company of revolutionary veterans for the purpose of settling the district of Ohio, and he was one of the three directors of the Ohio Company. Partly through his influence, Congress passed the Ordinance of 1787, establishing a civil government in the territory. In the same year it sold to the Ohio Company a million and a half acres at the junction of the Muskingum and Ohio rivers. There, in the following year, Putnam established the town of Marietta. In 1796 he became surveyor-general of the United States. With the exception of Marquis de Lafayette, he was the last surviving general officer of the Revolutionary army.

Putrefaction, the decomposition of dead organic matter, which is usually accompanied by the rise of ill-smelling gases. It is now known to be due to the agency of bacteria or other organisms, which find their way to the dead matter and multiply rapidly therein. The substances in which these bacteria are thus developed separate into their original elements or are reduced to much more simple compounds. The decay of animal substances is usually accompanied by more poisonous and fetid exhalations than come from the decay of vegetable products. Ammonia or ammoniacal compounds and other combinations of hydrogen, together with their highly infectious vapors and gases, are formed in most cases of animal putrefaction. Chlorine will usually render these harmless. The rapidity of putrefaction and the nature of its products are to a great extent dependent upon temperature, moisture and the access of air. Substances decay most rapidly in a temperature of between sixty and eighty degrees, where there is considerable humidity and a free access of air. Putrefaction, then, may be checked or altogether prevented by a very high or a very low temperature, by excluding the air and by keeping the body dry. Certain antiseptics prevent, and to some extent arrest, the progress of putrefaction. See BACTERIA AND BACTERIOLOGY; FERMENTATION.

Putty, a cement prepared by mixing whiting with linseed oil. It is used by glaziers to fix glass in position, and by painters to fill cavities in wood surfaces. For inside work, putty is improved by adding white lead; for exposed situations, the oil is boiled. A putty which hardens quickly is composed of powdered red lead, mixed with boiled oil and varnish.

Pygma'lon, in Greek mythology, a king of Cyprus and a celebrated sculptor. The most of his sculpture consisted of images of the gods,

and he made one day a figure of Galatea, which was so beautiful that he fell in love with it. In response to his prayers Venus gave the statue life, and she became the bride of Pygmalion.

Pyg'mies, a race of dwarfs, first mentioned by Homer as dwelling on the shores of Ocean, and as having to sustain a war against the cranes every spring. Later writers place them mainly in Africa, and there is in fact a dwarfish race in the interior of Africa.

Pyle, HOWARD (1853-1911), an American artist and author, born in Wilmington, Del. He studied art in Philadelphia and began his career in New York. Making a reputation for himself almost at once, he soon returned to his native town. He is both author and illustrator of *The Merry Adventures of Robin Hood*, *A Modern Aladdin* and others. He was especially successful in juvenile work, and his best drawings were on subjects of the Colonial period of New England and New Amsterdam.

Pym, JOHN (1584-1643), an English statesman. He was a member of the Parliament of 1621 and attracted attention by his opposition to the royal encroachments on Parliamentary privileges. In the first three Parliaments of Charles I he was also prominent, and on the assembling of the Short Parliament, in 1640, he was recognized as its leader. The refusal of Parliament to grant supplies to Charles I until certain reforms had been promised was made under Pym's guidance. The impeachment of Strafford and the trial of Laud, undertaken by the Long Parliament, were conducted under his management, and he was one of the five members whom Charles attempted to arrest. He died before the war had progressed far.

Pyramid, a geometric solid bounded by a plane figure of three or more sides, called the *base*, and triangles, which meet at a common point, called the *vertex*. Pyramids are said to be triangular, quadrangular, pentagonal, etc., according as their bases are triangles, quadrilaterals, pentagons, etc. The pyramid is called *right* or *regular* when its base is a regular polygon and a perpendicular dropped from the vertex to the base will pass through the center of the base. The volume of a pyramid is equal to one-third the area of its base multiplied by the perpendicular distance from the vertex to the base, called the *altitude*. When the base of a pyramid is an equilateral triangle, and all its faces are equilateral triangles, it is called a *tetrahedron*. This figure is one of the five regular geometric solids.

Pyramids

Pyramids, in architecture, a colossal structure of masonry, in the form of a pyramid, used by the ancients in various parts of the world, especially in Egypt, as tombs of the kings or for religious purposes. The largest and most remarkable of the Egyptian pyramids occur in several groups on the west side of the Nile, on the border of the Libyan desert, extending for a distance of about 25 miles from north to south. There are about seventy-five in number, built chiefly of the hard limestone of the adjacent hills, but large blocks of granite brought from a distance were also used, especially on the outside. In the hills back of Thebes, in the so-called Valley of the Tombs of the Kings, there are so many of these royal sepulchers that the place has been called the "Westminster Abbey of Egypt." These structures are supposed to date from about 3000 B. C. to 2300 B. C. The stones used varied in size, but are mostly large, requiring wonderful mechanical skill to quarry them, transport them and raise and adjust them into their proper places.

An almost fabulous number of laborers were engaged in erecting the chief Egyptian pyramids, of which the group of Gizeh, four miles southwest of Cairo, in the neighborhood of the ancient Memphis, is the most remarkable. This group consists of nine pyramids, of which the three most celebrated of all, accounted among the seven wonders of the world, are the pyramid of Cheops (Khufu), called the Great Pyramid; that of Cephren (Khafra), and that of Mycerinus (Menkauru). According to Herodotus, Cheops employed 100,000 men for twenty years to complete the building of the Great Pyramid. The base forms a square, each side of which was originally 768 feet, though now, by the removal of the coating, it is only 750 feet long, and covers a space of 13 acres. The outer surface forms a series of steps, each of the average height of three feet or more. When the structure was perfect, this step formation was hidden by the coating, which rendered the sides quite smooth, and the apex, where there is now a space of twelve square yards, was no doubt originally quite sharp. The height was originally about 480 feet, but it is now only 451. The interior, entered 49 feet above the base of the north face, contains several chambers, one of which, called the King's Chamber, is 34½ feet long, 17 feet wide and 19 feet high and contains a sarcophagus of red granite. About 350 yards southwest of this pyramid is the celebrated Sphinx. The second pyramid is

Pyrenees

690 feet square and 447 feet high. The third pyramid is only 354 feet square and 203 feet high and is the best constructed of the three.

With regard to the mode of construction of the pyramids, it is believed that when a king ascended the throne, he began to build a small, but complete tomb for himself, each year adding to it a fresh coating of stone, so that at his death the sides of the pyramid were like long flights of stairs. The size of the monument was proportioned to the builder's reign. After the body of the king had been laid in the innermost chamber, the door was walled up and the smooth sides of the pyramid made his finished tomb.

Ruins of pyramids are to be found at Benares in India and in other parts of the East. Certain monuments of the ancient inhabitants, found in Mexico, are also called pyramids. These seem to have been intended to serve as temples, the tops of them being flat and surmounted by a house, or chamber, in which sacred rites were probably performed. The largest, and perhaps the oldest of them, is that of Cholula, in central Mexico, which is said to have a base of 1770 feet and a height of 177 feet.

Pyramus and This'be, a pair of devoted lovers of Babylon, who, as their story is told by Ovid, were prevented by their parents from meeting openly and were therefore in the habit of secretly conversing through an opening of the wall, as their houses adjoined. They agreed one day to meet at the tomb of Ninus, and Thisbe, who was first at the meeting-place, was surprised by a lioness and took to flight. In her haste she dropped her garment, which the lioness seized in her bloody jaws. Pyramus appeared shortly afterward, and concluding from the blood-besmeared robe that Thisbe was dead, killed himself. Thisbe on her return found the body of her lover and in despair put herself to death. The story was very popular in the time of Shakespeare, who made it the subject of the burlesque interlude in *A Midsummer Night's Dream*.

Pyrenees, *pir'e neez*, a lofty mountain range, the crest of the main chain of which forms the boundary between France and Spain. It extends from the Mediterranean to the Atlantic; its length from Cape Creux, on the Gulf of Lyons, to Fuenterrabia, on the Bay of Biscay, is about 270 miles, and its greatest breadth is little more than 50 miles. It consists of two lines, which form parallel ridges about 20 miles apart, except

Pyrite

in the center, where the distance between them is considerably greater. The descent on the south side is much more abrupt than on the north. The loftiest summits are nearly all near the center, where the culminating point, the Pic d'Anethou, reaches a height of 11,168 feet. In the Pyrenees is to be found some of the finest scenery in France. The climate is mild, and the snow line is over 1000 feet higher than the snow line of the Alps. The French Pyrenees abound in mineral springs, and a number of famous watering places are located on the northern slopes of the mountains. The chief passes of the Pyrenees are the Col de Portus, the Col de Perche and the Pass of Roncesvalles.

Pyrite or **Pyrites**, *pir ri' teez*, in mineralogy, a term applied to the combination of iron, copper or arsenic with sulphur, forming a sulphite. The word means *flint*, or a stone that strikes fire, and the name is applied to this class of minerals, because of the fact that when struck with steel or some other hard substance, a spark usually results. In ordinary usage, the term is confined to *iron pyrite*, which is a compound of iron and sulphur. It has a bright luster and a brassy, yellowish color, and because of this it is often mistaken for gold. The mineral occurs in crystals in the form of cubes and in mass; it is also sometimes found in fine grains in decaying rock. It is used in the manufacture of sulphuric acid and green vitriol, or copperas. *Copper pyrite* is sometimes smelted for the metal, and some deposits contain more or less gold and silver.

Pyrom'eter, an instrument used for measuring high degrees of temperature. The old style pyrometer, and one still found in physical laboratories, consists of a metallic bar, fixed in a frame so that when heated it will extend in one direction. The movable end is connected with a needle, which passes over a dial. As the bar extends, it moves the needle, and this indicates the degree of heat applied. This instrument is of no particular value, except to indicate the expansion of metals. Another pattern, in quite general use and much more successful than the first, consists of a metallic tube, with a bulb containing air, which presses against a column of mercury which it supports. The temperature is measured by the expansion of the air. The higher the temperature, the greater the expansion, and, consequently, the greater the extent to which the mercury in the tube will rise. Still another pattern consists of a coil of platinum wire, encased in a porcelain or fire clay tube.

Pyrrhus

The degree of heat is indicated by the resistance which the wire affords to the passage of an electric current, this resistance being measured by a galvanometer.

Pyrotechny, *pir o tek'ny*, the science of making and using artificial fireworks, the chief ingredients of which are niter, sulphur and charcoal. Iron filings yield bright red and white sparks. Steel filings and cast iron borings contain carbon and give a more brilliant fire, with wavy radiations. Copper filings give flame a greenish tint, those of zinc a fine blue color; the sulphuret of antimony gives a less greenish blue than zinc, but with much smoke; amber, resin and common salt give a yellow fire. Lampblack produces a very red color, with gunpowder, and pink, with niter in excess. Verdigris imparts a pale green; sulphate of copper and sal-ammoniac, a palm-tree green. Lycopodium, used, also, in the manufacture of stage lightning, burns with a rose color and a magnificent flame. See FIREWORKS.

Pyrox'ene or **Aucite**, a mineral composed of silica, calcium and magnesium, often combined with iron, and sometimes with zinc and manganese. It occurs in prismatic crystals and also in granular form. There are colorless varieties, to each of which a specific name is given, but they are of no special interest except to the mineralogist. The varieties containing aluminum and small quantities of potash, soda or lime are of a dark color and constitute some of the common minerals. They are found crystallized in limestone and other common rocks. Pyroxene is an important constituent of many igneous rocks, and with labradorite or magnetite it forms basalt.

Pyrox'ylin. See GUNCOTTON.

Pyrrhus, *pir'rus*, (318-272 B. C.), king of Epirus, one of the most illustrious generals of antiquity. He was placed on the throne when about twelve years of age and reigned peacefully for five years, until advantage was taken of his absence to transfer the crown to his great uncle, Neoptolemus. After serving with his brother-in-law and greatly distinguishing himself at the Battle of Ipsus, against Antigonus, Pyrrhus recovered his dominions and caused his rival to be put to death. He next contended for possession of Macedonia, and in 280 he passed over into Italy, to assist the Greeks there against Rome. He defeated the Romans in two battles, but with severe loss to himself; he then passed over into Sicily, returned to Italy again and was defeated at Beneventum in 275 B. C. He now

returned to Greece and attempted the conquest of the Peloponnesus, but was killed at Argos.

Pythag'oras (about 584-510 B. C.), a Grecian philosopher and mathematician, of whose real history we know little. It is thought that he was born at Samos, that he traveled extensively and studied in many lands, that about 530 B. C. he settled in the Greek city of Crotona, in lower Italy, and there founded among the aristocracy a political or religious school, which grew to have a considerable influence. But so strange and heathenish did its doctrines appear to the people that they rose in anger and killed most of the followers of Pythagoras. It is thought that he had removed to Metapontum and died there before the uprising. Pythagoras did not put his doctrines into writing, and it is impossible to tell just what he taught and what was added by his followers, who are called the Pythagoreans. They believed in self-restraint, in temperance, obedience and simplicity. Their astronomical beliefs foreshadowed those of Copernicus, for they taught that the sun was a central fire, around which the stars revolved. They believed in the all-importance of music, and that everything in the universe is number; the soul, for instance, was related with the number six, friendship with eight, health with seven. They believed in the transmigration of souls, and it is said that Pythagoras would not beat his dog, because he recognized a friend in him. The school did much for the study of mathematics, and it is quite certain that Pythagoras discovered the proof of the proposition that the square on the hypotenuse of a right triangle is equal to the sum of the squares on the other two sides. This is known as the *47th problem in Euclid*, or the *Pythagorean theorem*.

Pythago'rean Theorem, a famous proposition enunciated by Euclid, forming the forty-seventh theorem in the first book of his *Elements*. It proves that the square of the hypotenuse of any right-angled triangle is equal to the sum of the squares of the other two sides.

Pyth'ian Games, one of the four great Grecian festivals, instituted in honor of Apollo and celebrated at Delphi. Until about 586 B. C., they were under the management of the Delphians and took place every eighth year; but after that date they were conducted by the Amphictyons and were celebrated every fourth year, prizes being given for flute playing, for athletic sports and for horse and chariot racing. Eventually, contests in tragedy, painting, sculpture and other intellectual and artistic accomplishments were added. At first, prizes of silver or gold

were awarded, but afterward the simple laurel wreath and palm branch were substituted. They continued to be celebrated until the end of the fourth century of our era.

Pythias. See DAMON AND PYTHIAS.

Pythias, KNIGHTS OF, a fraternal, benevolent and social secret order, founded in Washington, D. C., in 1864. Its obligation of secrecy is more binding than that of most fraternal lodges. There is a supreme lodge, which has control over not only the order of knights, but the so-called uniform rank and the endowment, or insurance, branch, as well. The order confers three degrees, namely, page, esquire and knight. On January 1, 1912 the membership of the Knights of Pythias was 710,637, and the insurance in force amounted to \$99,700,000.

Python, a genus and family of serpents, allied to the boa family. They are not poisonous, but kill their prey by squeezing it. The pythons belong exclusively to the Old World, and are of enormous size, sometimes attaining a length of thirty feet. They are found in India and in the islands of the Eastern Archipelago, in Africa and in Australia. The head exceeds the neck in thickness, and the mouth is extremely large. The pythons suspend themselves from the branches of trees and lie in wait near water for animals which come to drink. Among the best known species is the rock snake of Ceylon, India and eastward. The African pythons are smaller than the Asiatic, and some of them are beautiful in their coloring. Certain savage tribes regard these serpents as sacred and guard them carefully in their temples. The eggs of the python are numerous, and the female coils herself about them to protect them.

Many stories have been told about the ability of the python to swallow animals of large size. Some of these stories have been greatly exaggerated, but it is true that a full-grown python can swallow a sheep or a goat. This is due to the fact that the jaws are very loosely hinged and that the halves of the lower jaw are but loosely joined by an elastic ligament. Thus the mouth may be greatly distended.

Python, in Greek legend, a huge serpent born from the slime which remained on the earth after the great deluge which destroyed all mankind except Deucalion and Pyrrha. He lived in a cave on Mount Parnassus, and none dared approach him. Finally Apollo killed him with his golden darts. The famous statue of the Apollo Belvedere represents Apollo just after he has slain the python. This myth, like many of the other Greek

Pyx

myths, is doubtless a mere personification of natural phenomena. The python represented the stagnant pools and marshes which breed malaria, while the slaying of the monster by Apollo was an allegory to illustrate the power of the sun (Apollo) to dry up such pestilence-breeding spots.

Pyx, a box or vessel used in Roman Catholic churches to contain the sacrament. In ancient times the pyx was shaped like a dove and was suspended above the altar. Now it is usually a gold or silver, or at least a gold- or silver-plated, vessel shaped like a cup, with a closely fitting cover. The same name is also applied to the small silver-plated box in which the host is carried to the sick.

Pyx, TRIAL OF THE. The name *pyx* is given to a chest or box at the British mint, in which spec-

Pyxie

imen. of the coinage are deposited. As often as the lords of the treasury desire, these gold and silver coins are tested by a jury of goldsmiths, who report as to whether or not the coins come up to the legal standard. This periodical testing is known as the *trial of the pyx*.

Pyxie, **Flowering Moss** or **Pine-Barren Beauty**, a small evergreen trailing plant, common in New Jersey and North Carolina. It is one of the most beautiful of the early spring plants. Its slender stems, which extend over the ground in all directions, bear small evergreen leaves, which are, however, almost hidden by the flowers. These flowers, which in the bud are pink, have, when open, a waxy white color. The pyxie is sometimes sold early in the spring in the cities of New Jersey and North Carolina.



Q, the seventeenth letter in the English alphabet, a consonant having the same sound as *k* or hard *c*. It is a superfluous letter in English, as the combination *qu*, in which it always occurs, could be equally well expressed by *kw*, or by *k* alone when the *u* is silent. It did not occur in Anglo-Saxon, in which the sound *qu* was regularly written *cw* or *cu*, but was borrowed from the Norman French.

Quadrant, *kwahd'rant*, an instrument for measuring angular altitudes, variously constructed and mounted for different specific uses in astronomy, navigation and surveying. Originally it consisted of a graduated arc of 90°, with an index, or vernier, and either plane or telescopic sights, along with a plumb line or spirit level for fixing the vertical or horizontal direction. Its principle and application are the same as those of the sextant, by which it is superseded. See **SEXTANT**.

Quadriga, *kwod ri'ga*, an ancient two-wheeled car, or chariot, drawn by four horses abreast. It was used in racing in the Greek Olympic games and in the games of the Roman circus.

Quadrilateral, *kwahd'ri lat'ur al*, a four-sided polygon. A *trapezium* is a quadrilateral no two of whose sides are parallel; a *trapezoid* is a quadrilateral two of whose sides are parallel, and a *parallelogram* is a quadrilateral whose pairs of opposite sides are parallel. Three classes of parallelograms are important—the rectangle, all of whose angles are right angles; the rhombus, none of whose angles are right angles and whose adjacent sides are equal, and the rhomboid, none of whose angles are right angles and whose adjacent sides are not equal. See **POLYGON**.

Quadrille, *kwahd ril'*, a dance of French origin, which consists generally of five consecutive figures or movements, danced by four couples, each forming the side of a square. The time varies between triple and duple time.

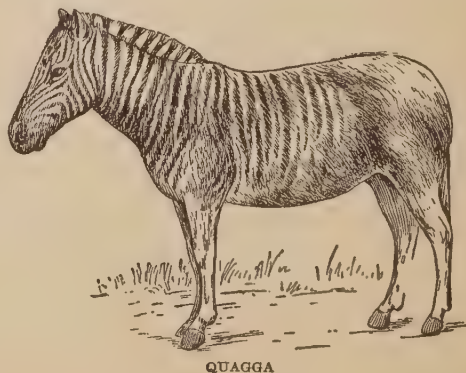
Quadrumana, *kwahd ru'ma na*, the monkeys, lemurs and apes, the group of primates which use

their feet like hands. They are not regarded as a distinct class by the modern zoölogist, who includes most of the two-handed mammalia with the *Quadrumana* in one order. See **PRIMATES**.

Quadruple, *kwahd ru'p'l*, **Alliance**, an alliance concluded in 1718 by Great Britain, France and Austria, joined by Holland in 1719, for the maintenance of the Peace of Utrecht. The occasion of the alliance was the seizure by Spain of Sardinia and Sicily in 1718, both of which she was forced to give up. Another quadruple alliance was that formed by Austria, Russia, Great Britain and Prussia in 1840, for the purpose of checking the ambitious plans of Mehemet Ali.

Quaestor, *kwes'tor*, the name of certain magistrates of ancient Rome, whose chief office was the management of the public treasury. Quaestors accompanied the provincial governors, received taxes and paid the troops. The office at first could be held only by patricians, but in 421 B. C. the number, which had formerly been two, was doubled, and plebeians became eligible. The number was further increased as province after province was added to the Roman territory, till in the time of Julius Caesar it reached forty.

Quag'ga, a species of the horse genus, closely



allied to the zebra. It was formerly found on the plains of southern Africa. Though striped

Quail

like the zebra on the body, it yet possessed no bands on the limbs. It was of a dark or blackish-brown color on the head, neck and shoulders, and the back and hind quarters were of a lighter brown. The under parts of the body were white, the upper parts of the legs and tail being marked by whitish bars. The quagga was smaller than the zebra and bore a closer resemblance to the horse. Its food consisted of grasses and mimosa leaves. It was hunted extensively by the Boers, both for flesh and hide.

Quail, a small bird of the partridge group, in the grouse family. There are a number of differ-



CALIFORNIA QUAIL

ent species, of which the true quail, a native of Europe, was a great favorite with the ancients, who used to keep the birds in captivity and make them fight for the amusement of their owners. It is a migratory bird, and is about eight inches in length. Its upper parts are brownish, with light and dark markings, and its under parts are yellowish. In the United States the common quail is the bird whose clear whistle and call of "bob-white" has given him his common name. He is a trim, plump bird of brownish-red color, whose head is marked with white and black bands. The rude nest is built on the ground and contains from eight to ten clear white eggs. As soon as the young are hatched they leave their nest, but they run about with their mother, even through the winter. In the more thickly populated states the flesh of the quail has caused it to be hunted until it has been practically exterminated. In the Southern states the bob white is called the partridge. The California quail, which carries an erect crest of several long feathers, is a more

Quamash

beautiful bird, with richer drab, brown and black coloring.

Quakers or **Society of Friends**, a religious sect founded in England in 1648 by George Fox, a man of pure life and zealous devotion. From the first they were persecuted on all sides, and some of them were punished by the authorities with transportation. Their belief, as originally announced and not materially changed to this day, differs but little from the main creeds of orthodox believers. The principal feature which characterizes their faith is the doctrine of the "light of Christ in man." They found this doctrine on the view of Christ given by Saint John, where, in the first chapter of his gospel, he speaks of the "word" as the "life" and "light of man," "the true light," "the light that lighteth every man that cometh into the world."

In 1827, Elias Hicks, a Quaker of great influence and strong mental gifts, created a schism among the denomination in the United States by preaching a denial of the miraculous conception and divinity of Christ and the inspiration of the Scriptures. Nearly one-half of the Quakers of this country became converts of Hicks, and they have since been known as Hicksite Quakers, or Friends, while the adherents to the old faith are recognized as Orthodox Quakers. In England the denomination has greatly diminished in later years. The Quakers are marked by a number of peculiarities, both in their method of worship and in their ways of life. They have no stated ministry, and in conducting their meetings each individual speaks "as moved by the spirit." They do not believe in baptism and the Lord's Supper, and they keep no holy days except Sunday. The congregation is divided according to sex, the males sitting on one side of the "meeting-house" and the females on the other. It is the duty of the women to inspect and relieve the wants of the poor of their own sex and to look after proposals for marriage. The Quakers neither take nor administer oaths, and they object to war in all its forms, to "balls, gaming places, horse races and play houses," to an indulgence in music and to the reading of novels, plays or romances. In the different gatherings all questions of discipline and executive management are settled. But the government of the body is exceedingly simple, and it is seldom that any serious differences occur among its members. Their number in the United States in 1905 was 117,065.

Quam'ash or **Camass**, the North American name of a plant of the lily family. Roasted

quamash bulbs are much eaten by the indians, who prepare them by baking them in a hole in the ground, then pounding and drying them into cakes.

Quantity, *kwahn'ti ty*, that property of anything by virtue of which it is capable of being measured, increased or diminished; also, anything that can be measured, increased or diminished, as space, time, number, weight, mass, force. In mathematics, the symbols representing quantities are also called quantities (See IMAGINARY QUANTITY; NEGATIVE QUANTITY; VARIABLE QUANTITY). In grammar, quantity signifies the time in which a syllable is pronounced.

Quapaw, *kwah'-paw*, a Sioux tribe, better known as the Arkansas, now consisting of a few hundred persons living upon a reservation in Oklahoma. They were relatives of the Kaw, Ponca and Osage tribes, but early lost their position, because of their wars and dissipations.

Quarantine, *kwor'an teen*, originally the period of forty days during which a ship coming from a port suspected of contagion, or having a contagious sickness on board, was forbidden intercourse with the place at which she arrived. By act of Congress passed in 1888 national quarantine stations were established; and it is made a misdemeanor punishable by fine or imprisonment, or both, for the master, pilot or owner of any vessel to enter a port of the United States in violation of the act or of regulations framed under it. In most of the states and cities of the United States, a house or a whole town may be quarantined and its inhabitants prevented from leaving. Oftentimes the laws are very strict, as is usual concerning homes containing cases of diphtheria, smallpox or scarlet fever, when for a month or more no one but the physician may leave, provisions are left outside and nothing can be carried from the house. Before the quarantine is lifted, the premises are fumigated or thoroughly disinfected in other ways.

Quart, *kwawrt*, a measure of both dry and liquid capacity in the English system of weights and measures. As a unit of dry capacity it contains 67.2 cubic inches, is divided into two pints and is approximately equivalent to 1.101 liters. As a unit of liquid measure it contains 57.75 cubic inches, is also divided into two pints and is approximately equivalent to .9463 liters. See WEIGHTS AND MEASURES; METRIC SYSTEM.

Quarter, the name of two measures, one of weight and the other of capacity. The first is the fourth part of a hundredweight, 28 pounds or 25 pounds, according to whether the hundred-

weight be considered to contain 112 or 100 pounds. The second, which is used especially in measuring grain, contains 8 bushels.

Quart'erstaff, an old English weapon, formed of a stout pole about 6½ feet long, generally loaded with iron at both ends. It was grasped by one hand in the middle, and by the other between the middle and the end. By shifting the latter hand from one quarter to the other the staff was given a rapid whirling motion that made it a highly dangerous weapon.

Quartz is the most abundant mineral and forms a portion of nearly all rocks. Pure quartz looks like the best quality of glass, for which it might be easily mistaken. A quartz crystal has the form of a six-sided prism, with a pyramid at the end. The prisms are so hard that one can easily write on glass with them. When colorless this form of quartz is called rock crystal, and it is used to some extent in making ornaments and lenses for spectacles. When colored, quartz crystals take different names (See PRECIOUS STONES).

The most common forms of quartz occur in rocks. They vary in color from milky white to black. Red and brown quartz rocks are called jasper. Sandstone is formed of grains of quartz cemented together by some other mineral. Quartz forms a good proportion of granite, and it can be easily detected by its resemblance to broken glass. When quartz is ground to a powder and heated with potash, lime or soda, it melts and forms glass. The waters of many hot springs dissolve quartz, and when they cool, it forms in beautiful crystals around the edges of the springs. Some of the celebrated springs in Yellowstone Park are ornamented in this way.

Quartzite, a metamorphic, stratified, granular, crystalline rock, consisting entirely, or almost entirely, of quartz. It is usually a sandstone which has been altered by heat and is of a grayish or pinkish-gray color, on account of a slight trace of iron.

Quassia, *kwosh'ea*, or **Bitter Ash**, a genus of South American tropical plants, consisting of trees and shrubs. The wood of two species is known in commerce by the name of quassia. One, a native of Panama, Venezuela, Guiana and northern Brazil, is a small tree with handsome crimson flowers; the other is a native of Jamaica. Both kinds are imported in billets and are inodorous, but intensely bitter, especially the Jamaica quassia. It is a pure and simple bitter, possessing marked tonic properties. An infusion of quassia, sweetened with sugar, is use-

Quaternary Period

ful for destroying flies. Jamaica quassia was formerly substituted by some brewers for hops, but it is now prohibited under severe penalties.

Quaternary, *kwah tur'na ry*, **Period**, the name given that division of geologic time extending from the Tertiary period to the present. It is also called the *Age of Man*. On account of a difference in classification between European and American geologists, there is some confusion in the use of this term. The English geologist Lyell united the Glacial and Champlain periods under the name Pleistocene, and in so doing he divided the Quaternary into two periods, the Pleistocene and the Recent. The terms *Quaternary* and *Pleistocene* are also used synonymously in some classifications. The American geologist Dana divided the Quaternary into three periods, the Glacial, the Champlain and the Recent. American geologists usually follow Dana, while the Europeans follow Lyell. See GEOLOGY; GLACIAL PERIOD; TERTIARY PERIOD.

Quay MATTHEW STANLEY (1833-1904), an American politician, born at Dillsburg, Pa. He graduated at Jefferson College in 1850, was admitted to the bar four years later, served as lieutenant of Pennsylvania reserves in the Civil War and in 1865 was chosen to the state legislature. In 1872 he became secretary of state and was reelected until 1878 and again from 1879 to 1882. Three years later he was made state treasurer, and from that time forward he took a prominent part in politics, as a member and, for a time, as chairman, of the Republican national committee. In 1887 he was chosen United States senator, serving until 1899, when he was tried for misappropriation of public funds, but was acquitted. On the same day he was reappointed United States senator and was reelected in 1901.

Quebec', the capital of the Province of Quebec, and the oldest city of Canada, situated on the Saint Lawrence River, about 300 mi. from the Gulf of Saint Lawrence, 180 mi. e. by n. of Montreal and 430 mi. n. e. of New York. The city is built upon and around a promontory called Cape Diamond, whose highest point is 353 feet above the river. It is divided into the upper and lower towns. The lower town is built along the river banks, at the foot of the bluff, and contains the wholesale district, the wharves, the railway depots and the principal business establishments. The upper town is built upon a terrace and on the top of the bluff and is from 100 to 300 feet higher than the lower town. The two parts of the city are connected by steep, nar-

Quebec

row streets and by flights of steps, some of which have been cut in the rock. The upper town is devoted to residences, hotels, churches, convents and retail establishments. A portion of this part of the city is enclosed by a high wall, which extends around the point of the bluff and was formerly entered through a number of gates, though all but two of these have been removed. In general, the streets are narrow and irregular, except in the more level parts of the upper town, where the city is regularly laid out. The high-



est point of the bluff, known as Cape Diamond, is occupied by the citadel, which encloses an area of about 40 acres and is usually occupied by a garrison of Canadian militia. The remarkable strength of this fortress during the French and Indian Wars gave Quebec the name *Gibraltar of America*, but the fortifications would afford little resistance to a modern warship. To the south of the citadel are the Plains of Abraham, on which was fought the battle that resulted in transferring all the French dominions in America to the British (See QUEBEC, BATTLE OF). At the foot of the citadel and extending a little to the north, occupying a terrace about a quarter of a mile long, is Dufferin Terrace, a celebrated promenade 200 feet above the river, from which one of the finest views of the city and the surrounding country can be obtained. Back of this terrace is the governor's garden, in which there is a monument to Wolfe and Montcalm.

Quebec more closely resembles an old European town than any other American city. Many of the older buildings are constructed of cobblestones, held together by mortar, and nearly all are of a gray limestone found in the vicinity. With few exceptions the roofs are covered with tin, and the style of architecture is that of the

French cities of the days of Louis XVI. These features, combined with its narrow, winding streets, give the city a quaint and interesting appearance. Among the most important public buildings are the houses of parliament and departmental buildings of the provincial government, the postoffice, the customhouse, the city hall, the armory and the exhibition building, the courthouse and a number of business blocks and banks. Among the churches, the Basilica, formerly the Catholic cathedral, situated on one side of Market Square in the upper town, is of first interest. It seats an audience of about 4000 and contains a number of paintings of Van Dyck, Carracci, Hallé and other distinguished painters. Nearby are the buildings of Laval University, the chief Catholic college of Canada, noted for its museum of indian antiquities (See LAVAL UNIVERSITY). The English Cathedral, the First Methodist Church and Saint Andrew's Presbyterian Church are also worthy of mention. Quebec contains a number of large convents. Among these, the Ursuline Convent is celebrated for its large building and beautiful grounds. It is also of historic interest, because within the building are the remains of Montcalm. Hotel Dieu is also worthy of mention, because of the large hospital connected with it. Nine miles south of the city are the Falls of Montmorency, formed by the Montmorency River, where it plunges over the bluff to reach the Saint Lawrence. This little cascade is 275 feet high and is famous for its beauty. Across the river, near Levis, are the Chaudière Falls, 350 feet wide and 150 feet high. Another object of interest is the great cantilever bridge, the largest of its kind in the world, connecting Quebec with Levis, on the opposite bank of the Saint Lawrence. The shipping of lumber and the manufacture of textiles, boots and shoes are the leading industries.

The site of Quebec was first visited by Cartier in 1535 and was then occupied by the indian village of Stadacona. The first settlement was made by Champlain in 1608. The city was captured by the English in 1629 and was restored to the French three years later. In 1690 the New England colonists made an expedition against it, but failed. Another similar expedition which also resulted in failure occurred in 1711. During the French and Indian Wars it was an important military post and the center of French activities. It fell into the hands of the English in 1759, and the result of the capture was confirmed by the Treaty of Paris four years later. Quebec was the capital of Canada

until 1858, when the capital was transferred to Ottawa, Quebec remaining only as the capital of the province. The city has grown very slowly. Population in 1911, 78,190, fully five-sixths of which is of French descent. Consult Parker's *Quebec: The Place and the People*.

Quebec, a province of the Dominion of Canada, bounded on the n. by Hudson Strait and Ungava Bay; on the e. by the Atlantic Ocean and Labrador; on the s. by the Gulf of Saint Lawrence, New Brunswick, Maine, Vermont, New York and Ontario, and on the w. by Ontario, Hudson Bay and James Bay. Except the narrow strip of Labrador and a small part of Ontario, Quebec has only water boundaries. The greatest extent from east to west is about 1000 miles, and from north to south, about the same. The area is 706,834 square miles, of which 5000 square miles are water. The water area is exclusive of the Gulf of Saint Lawrence. In size, Quebec is more than two and a half times Texas and nearly six times the British Isles.

SURFACE AND DRAINAGE. The land along the Saint Lawrence River and between the Saint Lawrence and Richelieu is low and level, but with this exception that portion of the province south of the Saint Lawrence is traversed by the Notre Dame Mountains, which are an extension of the Green Mountains and follow the course of the river in a northeasterly direction to Gaspé Peninsula. These mountains are really a low plateau, but here and there are a few prominent peaks, among which Black Mountain, Beloeil, near the Richelieu River, and Sutton Mountain, farther east, are the most prominent. Mount Royal, near Montreal, is also noticeable, but it is considered to be of another formation. North of the Saint Lawrence is the Laurentian Plateau, consisting very largely of a rocky, undulating surface, with but little good soil, though a large portion of the region is quite heavily timbered. This plateau is traversed by the Height of Land, which separates the rivers flowing into the Atlantic from those flowing into the Arctic Ocean. In the western part of the province this reaches an altitude of 1000 feet, but it gradually rises toward the east, until, along the northern banks of the Saint Lawrence, bluffs ranging from 1500 to 1900 feet are found.

The Saint Lawrence and its tributaries drain nearly all of the province, and to the influence of this magnificent river Quebec owes very much of her development and prosperity. The chief tributaries of the Saint Lawrence from the north are the Ottawa, the Saguenay, noted for the

grandeur of its scenery, the Manicougan and the Natashquan. The province contains a number of lakes, which are north of the Saint Lawrence. Lake Saint John, on the Saguenay, is reached by rail and frequented by tourists. The largest lake wholly within the province is Mistassini.

CLIMATE. Quebec has a cool temperate climate. The winters are long and severe, extending from November to April, and during the coldest weather the thermometer is liable to reach 20° below zero. The summers are warm, but not excessively hot. In general, the air is dry and bracing, and the climate is remarkably healthful. The rainfall is ample for agricultural purposes, and a large portion of the province is covered by deep snow during the winter.

MINERAL RESOURCES. The mineral resources, though ample, have not been extensively developed. This is owing to the absence of coal and the necessity of exporting ore to the United States or Great Britain. Iron, copper, lead and some graphite are found in the region south of the Saint Lawrence River, and in the eastern section of this region are the most celebrated asbestos mines in the world. These mines are fully developed and furnish nearly all the asbestos used in America and Europe. Granite is quarried in the counties north of Vermont and New Hampshire; limestone is quite widely distributed over the province, and extensive peat beds occur in the lowlands, though they have as yet been but little used.

AGRICULTURE. Agriculture is the chief industry; by far the larger portion of the inhabitants are engaged in it. The most fertile lands are in the river valleys and in that part of the province south of the Saint Lawrence. The chief crops are oats, wheat, potatoes, peas, buckwheat, turnips and tobacco. In some of the more favored localities, apples and plums of excellent quality are raised, and small fruits can be successfully grown in almost any part of this section of the province. The raising of live stock is an extensive branch of industry, and dairying has become an important source of income.

OTHER INDUSTRIES. Originally nearly all of the province was covered with forests, and that portion of the territory north of the Saint Lawrence still contains extensive tracts of pine, hemlock, spruce and some hard woods, and it is in this region that the lumber interests of Quebec are found. Among the manufacturing industries, the production of lumber and timber products is the most important. Other manufactures include sugar, boots and shoes, cotton and

woolen goods, wooden ware, matches, potash and other chemicals. The chief industrial centers are Montreal and Quebec. The streams and lakes abound in fish, and the taking of fish is an industry of considerable importance, the annual catch being valued at about \$2,000,000. In the extreme northern part of the province are many fur-bearing animals, and hunting these and curing their furs is a source of income to the inhabitants of the region.

TRANSPORTATION AND COMMERCE. The Saint Lawrence is navigable for large ocean steamers as far as Montreal and furnishes ample water transportation for the interior, as well as for those towns along its banks. The Grand Trunk and other railways thread that section south of the Saint Lawrence, so that all counties and nearly all townships in this region have ready access to the railway, while the Canadian Pacific and the Intercolonial systems have lines extending from Quebec to Montreal and westward on the north side of the Saint Lawrence. Numerous short lines are found in those regions where industries warrant their construction, and a branch has been extended northward to Lake Saint John.

The commerce of the province is considerable, the exports consisting of lumber, stock and dairy products and some manufactures, while the imports consist of manufactured goods. Most of the foreign trade is with Great Britain and the United States.

INHABITANTS AND LANGUAGE. The province was originally settled by the French, and the descendants of these colonists constitute more than three-fourths of the population. They have maintained not only the language, but many of the institutions and customs, of their ancestors, so that the Province of Quebec is more completely foreign than any other portion of the Dominion. In their habits of dress, in the construction of their dwellings and in their social life, the French Canadians form a class by themselves. In general they are industrious, frugal and prosperous. Notwithstanding the fact that thousands of them have emigrated to the New England states, the province increased over twenty per cent in population between 1901 and 1911, the date of the last census.

GOVERNMENT AND RELIGION. The chief executive is a lieutenant governor, appointed by the governor of the Dominion, with the advice of his council. The lieutenant governor is assisted by a council of 6 members, appointed for life. The legislature consists of a council of 24 members, appointed for life, and an assembly of

75 members, chosen by public vote. The administration of justice in Quebec differs quite materially from that in other Canadian provinces, since the French law and French system of courts are in vogue, this privilege having been granted the early inhabitants when Quebec became British territory.

About six-sevenths of the population profess the Roman Catholic faith. The remainder are divided among the various Protestant denominations, of which the Anglican Church, the Presbyterians and the Methodists have the largest followings.

EDUCATION. The public schools are under the administration of a superintendent of instruction, but a dual system is maintained, both the Catholics and Protestants having charge of schools of their respective faiths and having a right to prescribe certain religious instruction. Two provincial school committees are maintained, one being Catholic and the other Protestant. The local management of the schools rests with township or district officers. The province maintains a normal school, and there are a number of colleges and secondary schools under religious denominations. The most noted among the higher schools are Laval University at Quebec, a Catholic institution, and McGill University at Montreal, non-denominational, by far the most widely known of the educational institutions in the Dominion.

CITIES. The chief cities are Quebec, the capital; Montreal, Saint Henri, Hull and Sherbrooke, each of which is described under its title.

HISTORY. Cartier was the first white man to visit the province. In 1608 Champlain made the first settlement by founding a colony at Quebec (See CHAMPLAIN, SAMUEL). Seven years later the Recollet and Jesuit missionaries began their work among the Indians and explored a large part of the province. However, for a long time but few permanent settlements were made, those coming to the country from France being devoted to trading with the Indians and to exploring the wilds of the forests. Indian wars undoubtedly had much to do with preventing settlements during this period. After several changes, the Province of Quebec finally became a British province in 1763. Soon after, the region was divided into two provinces, Quebec being known as Lower Canada, or Canada East, and Ontario as Upper Canada, or Canada West. The provinces, however, were reunited in 1841 and remained under one colonial government until the formation of the Dominion, in 1867,

when Ontario again became independent, both provinces joining the federation. Population in 1911, 2,002,712.

Quebec, BATTLE OF, a memorable battle on the Plains of Abraham, before the city of Quebec, on September 13, 1759. The French garrison of the town, numbering about 16,000 were commanded by Montcalm, while the British attacking party were under General James Wolfe. After numerous vain attempts to take the citadel by storm, General Wolfe, finding a secluded cove in the river bank, landed his forces and led them by a dangerous and difficult path to the Plains of Abraham, back of the fort on the plateau above. There he gained a decisive victory over the French force, who, though fighting bravely, were overpowered and finally compelled to surrender. Both Montcalm and Wolfe were killed in the contest. The fall of Quebec was the death blow to French dominion in America.

Quebec was also the scene of a brilliant but disastrous exploit upon the part of the American forces at the opening of the Revolutionary War. Two forces, one under Montgomery, who had reached Quebec by way of Lake Champlain and the Saint John's River, and another under Benedict Arnold, who had marched through the Maine woods, made a combined assault on December 31, 1775. Though the Americans conducted themselves with the greatest bravery and were led by skilful and daring commanders, they were finally repulsed, owing chiefly to the death of General Montgomery and the injury to General Arnold. They were finally compelled to withdraw, leaving General Dan Morgan and his company of Virginia marksmen prisoners in the hands of the English.

Quebec Act, an act passed by the British Parliament in 1774, in order to provide a government for the Province of Canada. Among other things it extended the boundaries of the province to include all the Northwest Territory; it substituted French civil law for English law; it established an appointive legislative council, rather than a representative council; it practically established the Catholic religion, on account of the great preponderance of colonists of Catholic belief in Canada. The act aroused the greatest indignation in the thirteen colonies, since it established a despotic English government on their borders and brought them, almost all earnest Protestants, into contact with a strongly Catholic community.

Queen, the wife of a king, or a woman who is in her own right the sovereign of a kingdom.

In Great Britain the queen is either *queen consort*, that is, merely the wife of the reigning king, and in reality his subject, not his equal; or *queen regent*, holding the crown in her own right and having the same powers, prerogatives and duties as if she were a king and her husband a subject; or *queen dowager*, that is, widow of the king, enjoying most of the privileges which belonged to her as queen consort. Some countries permit no queen regent. See SALIC LAW.

Queen Anne's War. See FRENCH AND INDIAN WARS.

Queen Charlotte, shahr'lot, Islands, a group of islands in the Pacific Ocean, off the coast of British Columbia, north of Vancouver Island. They were discovered by Cook, about 1770, and were annexed to the British dominions in 1787. The more northern of the two larger islands is called Graham Island, and the more southern is Moresby Island. The area of the two, with a number of smaller islands, is 5100 square miles. All the islands are covered with magnificent forests; gold-bearing quartz of rich quality has been found, and copper and iron ores and a fine vein of anthracite coal also exist. The islands form part of British Columbia.

Queen Charlotte Sound, a channel in the Pacific Ocean, separating Vancouver Island from the mainland of British America and forming the first of a long series of inlets, continued along the north and east of that island.

Queensberry, JOHN SHOLTO DOUGLAS, Marquis (1844-1900), a famous English patron of sports. He served in the army for several years after receiving his father's title of marquis and later represented Scotland in the House of Lords. He is most famous as a patron of the art of boxing, and his name is given to the rules drawn up in 1867, which are most generally followed in boxing and pugilistic exhibitions.

Queensland, a state of the commonwealth of Australia, comprising the whole northeast portion of Australia north of New South Wales and east of South Australia and its Northern Territory, being elsewhere bounded by the Gulf of Carpentaria, Torres Strait and the Pacific. The most northern part forms a sort of peninsula, known as York Peninsula. Queensland has an area of about 668,500 sq. mi. Toward the west a large portion of the surface is dry and barren, but toward the east, and for a long stretch along the coast, boundless plains, or downs, admirably adapted for sheep walks, and ranges of hills, generally well wooded and intersected by fertile valleys, form the prevailing features of

the country. The coast is skirted by numberless islands, and at some distance from the coast is the Great Barrier Reef. The highest mountains are near the coast, the greatest elevation being about 5400 feet. The principal rivers are the Brisbane, the Burnett, the Pioneer, the Fitzroy and the Burdekin, flowing into the Pacific, and the Flinders and the Mitchell, flowing into the Gulf of Carpentaria. Some of these streams are navigable for a considerable distance. The coast is indented with many bays, affording capacious natural harbors, which have already been brought into practical use as the outlets for the produce of the adjacent districts.

The climate is healthful, and the temperature is comparatively equable. The mean temperature at Brisbane is 69°, and in the hottest parts of the state the temperature seldom rises above 97°. The rainfall in the interior is scanty and variable; the mean fall at Brisbane is about 50 inches, and in the northern coast districts it sometimes reaches 150 inches.

The native animals and plants are similar to those of the rest of Australia. There are many kinds of valuable timber trees and, a rare thing in Australia, a few good native fruits. Sheep farming is the chief industry, but agriculture, cattle rearing and mining are also important. The soil and climate are well suited for the production of all the ordinary cereals, as well as maize, tobacco, coffee, sugar and cotton. The chief products are sugar, maize, Irish and sweet potatoes and semi-tropical fruits. Sugar growing is becoming a very important industry.

Gold, tin, lead and copper are the principal minerals. The production of gold has averaged in value more than £2,000,000 (\$9,720,000) annually since 1889. Coal and plumbago are found in large quantities, and cinnabar, antimony and manganese are also among the mineral products. In the north, pearl fishing is actively carried on. The manufactures are unimportant. The principal manufactures, or works that may be classed as such, are sugar mills, steam sawmills, soap works, agricultural implement works and distilleries. There are now over 4000 miles of railways in operation, as well as efficient telegraph and telephone systems.

The executive department of the government is vested in a governor, who is assisted by a council or cabinet of nine members. The legislative council consists of forty-two members, and the assembly has seventy-two members, elected by the people for three years, and representing

electoral districts. The capital of the state is Brisbane.

The first settlement of Queensland took place in 1826, when the territory was used as a place of transportation for convicts, who continued to be sent there till 1839. In 1842 the country was opened to free settlers. It was originally a part of New South Wales and was organized as a separate colony in 1859. In 1899 the colony accepted the constitution of the Australian Commonwealth. Population in 1911, 605,813.

Queen's Tobacco Pipe or King's Tobacco Pipe, the name popularly given to a furnace in London, situated in the northeast corner of the tobacco warehouses belonging to the London docks, so called because it was formerly used for burning all sorts of contraband or smuggled articles seized by the customhouse officers, but especially tobacco and cigars. Such goods are now usually sold.

Queens'town, formerly Cove of Cork, a maritime town of Ireland, an important naval station 10 mi. e. s. e. of Cork, on the south side of Great Island, which rises abruptly out of Cork harbor to a considerable elevation. The streets rise above one another and present a very picturesque appearance. It is the port for the transmission of American mails and is a chief emigration station. It has little trade and no manufactures, being almost solely dependent on the military and naval establishments in its vicinity and on the numerous visitors attracted by the singular beauty of the place and by its delightful climate. Population in 1911, 9000.

Queenstown Heights, **BATTLE OF**, a battle of the War of 1812, fought at Queenstown Heights, near Niagara Falls, October 13, 1812. The American force was led by General Van Rensselaer, who crossed Niagara River from Fort George and attacked the Canadian force under General Brock, encamped at Queens-town. Van Rensselaer's expedition was a failure, owing to the absence of effective support from other commanders. The most important event connected with the battle was the death of General Brock, who was mortally wounded in the action. A beautiful monument was erected in 1824 by the Ontario legislature on the spot where he fell.

Quelpaert, *kwel'pahrt*, a rock-bound island, 45 mi. long by 20 mi. broad, off the south coast of Korea, to which it belongs. The soil is fertile, the climate is temperate and there is a large population. The interior is mountainous,

and one summit, the volcanic Mount Auckland, is 6700 feet high.

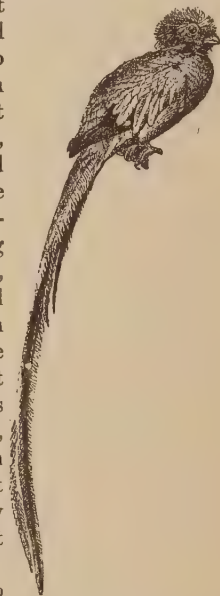
Queretaro, *ka ray'ta ro*, a city in Mexico, capital of the State of Queretaro, on a plateau 6166 feet above sea level, 110 mi. n. w. of the City of Mexico. Among the more noteworthy public edifices are the principal church, a magnificent and richly-decorated structure; a convent, and various hospitals and asylums. There is an aqueduct about two miles long, with arches 90 feet high, which communicates with a tunnel in the opposite hills and brings a copious supply of water from a distance of six miles. The city has cotton manufactures of great importance. Maximilian of Austria was made prisoner and executed here in 1867. Population in 1910, 35,011.

Quetzal, *kwet'sawl*, a most beautiful Central American bird, of the trogon family. It is about the size of a magpie, but it carries gorgeous emerald feathers, from three to three and a half feet in length. These are not strictly the tail-feathers, which are shorter and black and white, but the upper tail-coverts, growing beyond and covering the tail proper. The back, head, crest, throat and chest are of the same rich emerald hue, and the lower parts are a brilliant scarlet. The female does not have the long feathers, and is much plainer in her coloration. The feet of the quetzal are very small and entirely unfit for walking.

Quetzalcoatl, *kets'al ko ahl'tl*, the god of the air of the ancient Mexicans, who presided over commerce and the useful arts and is said to have predicted the coming of the Spaniards to Mexico.

Quezaltenango, *ka sahl'ta nahn'go*, a city of Central America, in Guatemala, capital of the Department of Quezaltenango. It has cotton, linen and woolen manufactures and a considerable trade. It was founded by the Spaniards in 1524. Population in 1910, 28,940.

Quichua, *ke choo'a*, the name of a native race of South America, inhabiting Peru and parts of Ecuador and Bolivia. With the Aymara, the



QUETZAL

Quicksand

Quichua composed the larger portion of the population of the empire of the Incas. The Quichua language, which was formerly the state language of the Incas, is still the chief speech of Peru, of a large portion of Bolivia, of the part of Ecuador bordering upon Peru and of the northern section of the Argentine Republic.

Quick'sand a large mass of loose or moving sand, mixed with water, formed on many sea coasts and at the mouths of rivers. It is composed of smooth, water-worn particles of sand, which do not mass together under pressure, but yield readily. Bodies which fall into such sand are soon engulfed and often sink to incredible distances beneath the surface.

Quick'silver. See MERCURY.

Quigley, JAMES EDWARD (1854-1915), a Catholic prelate, born in Oshawa, Ontario. He graduated from St. Joseph's College, Attica, N. Y., in 1872, and later studied at the University of Innsbruck in the Austrian Tyrol and at the College of the Propaganda in Rome. Immediately after his ordination as a priest in 1879 he became pastor of St. Vincent's Church, Attica, N. Y. After five years here, he was pastor of St. Joseph's Cathedral, Buffalo, for twelve years. In 1897 he was appointed bishop of Buffalo, and in 1903 archbishop of Chicago, succeeding the late Archbishop Feehan.

Quil'ler-Couch, kooch, ARTHUR THOMAS, SIR (1863-), English author, born in Cornwall. He was educated at Clifton College and at Trinity College, Oxford, where he later became a lecturer upon the classics. Removing to London, he wrote for the *Speaker* for many years. In 1891 he returned to his native country. His works consist of novels, essays and poems. Probably the best known are *Dead Man's Rock*, *Noughts and Crosses*, *The Delectable Duchy*, *The Adventures of Harry Revel* and *The Ship of Stars*. He was chosen to complete Robert Louis Stevenson's novel, *Saint Ives*.

Quillota, keel yo'ta, a town in Chile, in the province of Valparaiso, on the Aconcagua River, 26 mi. n. e. of Valparaiso. The copper mines in the vicinity are among the richest in Chile. The town has suffered severely on different occasions from earthquakes. Population in 1902, 9876.

Quince, kwins, a fruit related to the apple and the pear. The quince tree, which is supposed to be a native of western Asia, is now cultivated throughout Europe and in many parts of the United States, for its handsome, golden yellow fruit, which, though hard and unpleasant when

Quincy

plucked from the tree, becomes excellent when boiled and eaten with sugar or when preserved in syrup or made into marmalade.

Quincy, kwín'zy, ILL., the county-seat of Adams co., 265 mi. s. w. of Chicago, on the Mississippi River and on the Chicago, Burlington & Quincy, the Wabash and the Quincy, Missouri & Kansas City railroads. The city has excellent transportation facilities and a valuable trade in farm produce and manufactured goods. The industrial establishments include stove foundries, machine shops, breweries, show case works, a packing house, brickyards, flour mills and manufactures of wagons, agricultural implements, engines and various other articles. The city has an elevated location on a bluff 120 feet above the river. It contains the Saint Francis Solanus College, a Roman Catholic school for priests; Chaddock Boys' School, an industrial school for boys; Saint Mary's Institute and two schools of music. Other institutions are the state soldiers' and sailors' home, Saint Mary's and Blessing hospitals and several homes for orphans and the aged. The Federal building, the courthouse and the city hall are prominent structures. There are six parks, covering more than 100 acres. Quincy was settled in 1822 and was chartered as a city in 1839. Population in 910, 36,587.

Quincy, MASS., a city in Norfolk co., on Quincy Bay, adjoining Boston on the south, and on the New York, New Haven & Hartford railroad. It is primarily a residence place, but it also has extensive granite works, a large ship-building plant, machine shops and other factories. The city has more than 2500 acres of public parks, of which the most prominent are the Merrymount and the Faxon. It contains the Woodward Institute, for girls; the Adams Academy, the Crane Public Library and a city hospital. The first railroad in New England was built here, in 1826. It was operated by horses and was used for hauling stone in the construction of the Bunker Hill Monument. The place was settled in 1625 as Mount Wollaston. It remained a part of Braintree until its incorporation in 1792, when it was named in honor of John Quincy. It was the birthplace of John Adams, John Quincy Adams and John Hancock. Population in 1910, 32,642.

Quincy, JOSIAH (1744-1775), an American statesman and soldier, born in Boston. He graduated from Harvard University and was admitted to the bar and attained high rank as a lawyer. He early took a firm stand in oppo-

sition to the policy of Parliament in America, but was moderate in his discussion of the issues. With John Adams he defended the British soldiers who were assaulted during the Boston Massacre and thus incurred the antagonism of influential citizens. As a pamphleteer during all the pre-Revolutionary period, he exerted a great influence, and in September, 1774, he became agent of the patriot party in England. He died upon the return voyage in the following year.

Quincy, JOSIAH (1772-1864), an American lawyer and orator, son of Josiah Quincy (1744-1775). He was born in Boston, was educated at Harvard and was admitted to the bar. He early took an active interest in politics, as an extreme Federalist, was elected to the state legislature and in 1805 entered the House of Representatives, where he won distinction for his eloquence. He vigorously opposed the Republican administrations of Jefferson and Madison and particularly denounced the purchase of Louisiana, declaring it a just excuse for a division of the Union, and later opposed the War of 1812. In that year he retired from Congress, devoting himself thereafter chiefly to agriculture. However, he was elected to the Massachusetts house of representatives and later became mayor of Boston. In 1829 he became president of Harvard College, where he served with distinction until 1845.

Qui'nine, a white, crystalline substance, inodorous, very bitter and possessing the power to allay fevers. It is obtained from the bark of several trees of the *Cinchona* family, but perhaps the best is that made from calisaya bark. The substance was discovered about 1820, and it has entirely superseded the use of the bark itself in medicine, being most commonly used in the form of sulphate of quinine. The extraordinary value of quinine in medicine in allaying fevers, in curing malaria and as a general tonic has given rise to a large trade in Peruvian bark, and it has caused the cinchona tree to be extensively planted in India and elsewhere. Quinine in small doses is a tonic; in large doses it causes extreme disturbance of the nerves, headache, deafness, blindness and paralysis, and in rare cases, death.

Quin'sy, *quin'zy*, an inflammation of the membranes of the tonsils, often followed by the formation of ulcers which are difficult to heal. The disease usually begins with a chill, which is followed by fever and by severe pain and swelling of the tonsils. Sometimes the pain is intense and the swelling is so great that the jaws can scarcely

be moved, and a general fever and even delirium may result, but the disease is rarely fatal. It does not seem to affect either children or old people.

Quintilian (about 35-about 97 A.D.), a Roman rhetorician, born in Spain. He went to Rome in his youth and lived there for the rest of his life, with occasional visits to Spain. He practiced as an advocate and was very successful, but his chief fame lay in his extraordinary ability as a teacher of eloquence. His system of rhetoric, a work in twelve books, is remarkably sound in its judgments and broad in its treatment of literature. Over one hundred fifty declamations exist, which were for long ascribed to Quintilian, but it is believed now that these are for the most part spurious.

Quipo, *ke'po*, a cord about two feet in length, tightly spun from variously colored threads, to which a number of smaller threads were attached in the form of a fringe. It was used among the ancient Peruvians and Mexicans for recording events and keeping records of statistics. The fringe-like threads were also of different colors and were knotted. The colors denoted objects, as white for silver, yellow for gold, etc.; and sometimes they also embodied abstract ideas, as white for peace, red for war. They constituted a rude register of certain important facts or events, as of births, deaths and marriages, the number of the population fit to bear arms or the quantity of stores in the government magazines.

Quir'inal, one of the seven hills of ancient Rome, north of the Palatine. It was named for the god Quirinus, sometimes regarded as the deified Romulus, and his temple was one of the most conspicuous buildings which crowned the hill in ancient times. A palace on the Quirinal was begun in 1574, by Gregory XIII. Until 1870 it served as the summer residence of the pope, but since the unification of Italy it has been the palace of the king. It contains a number of noteworthy works of art, among them an *Annunciation* by Guido Reni. The arrangement and decorations are thoroughly modern.

Quiri'nus, among the Romans, a surname of Romulus after he had been raised to the rank of a divinity. Hence the name *Quirinalia* was given to the festival in honor of Romulus, held annually on the 13th day before the Calends of March, that is, the 17th of February.

Quirites, *kun i'tees*, a designation of the citizens of ancient Rome in the civil capacity. The name of Quirites belonged to them in addition to that of *Romani*, the latter designation

Quitclaim

applying to them in their political and military capacity.

Quit claim. See DEED.

Quito, *ke'to*, the capital of Ecuador, is situated a little to the south of the equator, in a ravine on the east side of the volcano of Pichincha, 9348 feet above the sea. Its streets, with the exception of four, which meet in the large central square, are narrow, uneven, badly paved and extremely dirty. The more important public buildings are the cathedral, several other churches and convents, the townhouse, the courthouse, the president's palace, the university, the episcopal palace, an orphan asylum and a hospital. The manufactures consist chiefly of woolen and cotton goods, saddles, shoes and carpets. The lack of good roads and railways has prevented the growth of any considerable trade. Quito was originally the capital of a native kingdom of the same name, but the modern town was founded by the Spaniards in 1534. It has repeatedly suffered from earthquakes. Population, about 80,000, largely half breeds and indians.

Quoits, a game played with flattish rings of iron, generally from $8\frac{1}{4}$ to $9\frac{1}{2}$ inches in external diameter, the rim being 1 or 2 inches in breadth. The quoits are convex on the upper side and slightly concave on the under side, so that the outer edge curves downward and is sharp enough to cut into soft ground. Two pins, called *hobs*, are driven into the ground from 18 to 24 yards apart, and the players, who are divided into two

Quo Warranto

sides, stand beside one hob. In regular succession they throw their quoits (of which each player has two) as near the other hob as they can. In throwing the quoit an upward and forward pitch is given it with the hand and arm; this imparts to it a whirling motion, which makes it cut into the ground. The two quoits nearest the hob count each a point toward the game; if a quoit leans against the hob it counts 3 and if it encircles the hob it counts 5 points. The game is often played with common horseshoes.

Quo'rum, the term applied to the number of members of an assembly required to be present at the transaction of business. This number varies and is usually fixed by the constitution, by-laws or charter of the organization; however, it may be determined by the assembly itself. A quorum is usually a majority of the regular members. In the British Parliament, however, in which the matter is determined by each house for itself, a quorum in the House of Commons is 40 members, and in the House of Lords, 3 members. The United States Constitution fixes the quorum of each of the houses of Congress at a majority of all the members. It was the former practice in the House of Representatives not to count the members who were present and did not vote on a question, in the determination of a quorum, but during the speakership of Thomas B. Reed, all members present were counted, and this is now the regular rule, though not a written one.

Quo Warranto. See WRIT.



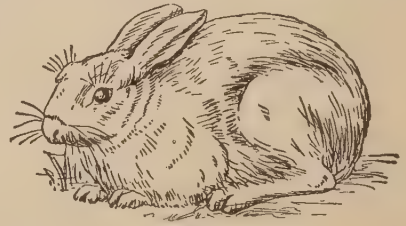
R, the eighteenth letter of the English alphabet. In Phœnician and in early Greek it resembled a *P*, and the extra line was added in Latin, after the *P* assumed its present form. In the pronunciation of English words it represents two somewhat different sounds. The one is heard at the beginning of words and syllables and when it is preceded by a consonant; the other, less decidedly consonantal, is heard at the end of words and syllables and when it is followed by a consonant. In the pronunciation of many English speakers, *r*, followed by a consonant at the end of a syllable, is scarcely heard as a separate sound, having merely the effect of lengthening the preceding vowel.

Rabat, *ra baht'*, a maritime town in Morocco, on the Atlantic, at the mouth of the Bu-Regreg. It is surrounded with a wall, flanked by numerous towers, and has a citadel and batteries. It has manufactures of carpets, woollens, cottons, pottery and leather and considerable trade in wool and corn. On the other side of the river mouth is the town of Sallee. Population, about 35,000.

Rab'bi, a title of honor among the Hebrews, corresponding nearly to the English *master*. There are two other forms of the title, *rabboni* and *rabbani*, the former of which is found in the New Testament. It is supposed that this title first came into use at the period immediately preceding the birth of Christ, and in the time of our Lord was applied generally to all religious teachers, sometimes to Christ himself. The term *rabbi*, or *rabbin*, is now applied to regularly appointed teachers of Talmudic Judaism.

Rab'bit, a genus of gnawing rodent animals, included in the same family with the hares. The rabbit is smaller than the hare and has shorter ears and shorter hind legs. Its coarse fur in its native state is of a nearly uniform brown color, but under domestication the texture changes and the color may become pure white or pure black, piebald, gray or other hue. Rabbits are natives of all temperate climates, and in the wild state they congregate in sandy pastures and on hill

slopes. They breed several times a year, beginning at the age of six months, and produce from five to seven or eight at a birth. They are so prolific that they may easily become a pest, as in



RABBIT

Australia, if not kept in check. They feed on tender grass and herbage and sometimes do great damage to young trees by stripping them of their bark. Rabbits make affectionate pets, and sometimes exhibit considerable intelligence. The skin of the rabbit, cleared of hair, is used with other skins to make glue and size. The fur is employed in the manufacture of hats and to imitate other and more valuable furs.

Rabelais, *ra b'lai'*, FRANÇOIS (about 1490—about 1553), a humorous and satirical French writer. He was at first a monk, but his desire for broad learning, beyond the bounds which his order permitted, brought him into disfavor, and he left the monastery for Montpellier, where he studied medicine and later practiced as a physician. In 1532 he went to Lyons as hospital physician, and two years later he accompanied Jean du Bellay on an embassy to Rome. On his return to France, he went first to Paris; but not long after he was once more at Lyons. In 1536 Rabelais was again at Rome, and on this occasion he obtained from the pope absolution for the violation of his monastic vows and permission to practice medicine and to hold benefices. Probably he was in Paris in 1546, but during most of 1546 and part of 1547 he was physician to the town of Metz. About 1550 Rabelais was appointed to the curacy of Mendon, but he resigned the position and died in 1553, according to most

authorities. His great work is the *Gargantua and Pantagruel*, a satirical romance dealing with the corrupt society of the time. By many Rabelais has been set down as a gross buffoon, and there is much in his writings to justify the harsh judgment, though he probably did or said little that was repulsive to the taste of his times. As regards the purpose of his work, many have looked upon Rabelais as a serious reformer of abuses, religious, moral and social, assuming an extravagant masquerade for the purpose of protecting himself from the possible consequences of his assaults on established institutions.

Raccoon' or **Coon**, an American flesh-eating mammal, closely related to the bear. The com-



RACCOON

mon raccoon is about the size of a cat, and its grayish-brown fur is deemed valuable, being principally used in the manufacture of hats. This animal lodges in hollow trees and feeds occasionally on vegetables, but usually on fish and small water animals. It inhabits North America from Canada to the tropics. The *agouara*, or *crab-eating raccoon*, is found on the American continent farther south than the above species and is generally larger. There is also a Himalayan species, called the *punda*.

Race, a term used to denote any swift course, applied, especially, to a contest of speed in running, walking, riding, driving, sailing, rowing, swimming or any other mode of progression.

In athletics, running races for distances varying from 50 yards to 25 miles, are now among the regular events, and furnish, perhaps, the most interesting contests (See **ATHLETICS**). During the period when bicycles were in great vogue, bicycle races were also common at such meets, as well as at fairs and special tree meetings.

Automobile and motorcycle races have recently taken a prominent place among sports, though less popular, because more expensive. Intercollegiate rowing races have long attracted wide attention in both England and America and are not only interesting for the skill displayed by the participants, but are spectacular and thrilling for the spectators. International rowing races have recently been arranged and have proved both interesting and profitable. The international yacht races between representatives of England and America have been conducted at frequent intervals for nearly fifty years and have invariably aroused the greatest enthusiasm.

Doubtless the most universally enjoyed of all racing sports are the horse races, which furnish the principal amusement features at the autumn fairs in all parts of the country and at many special racing meets in the larger cities of both England and America. The length of the course at these races varies from one-half a mile to two miles, and several "heats" are run in each race, the horse which ranks best in all or in a majority of the heats or shows its superiority according to a prearranged standard being declared the winner.

The race horse has been developed by careful breeding and training, through sacrificing all qualities to that of high speed for comparatively short distances. Such horses are classed according to the character of their stride, as trotters, pacers or runners. Usually, separate races are provided for each class, and often restrictions are made as to age, sex, speed or other special characteristics. The trotting record up to 1914 was made by Uhlan on October 8, 1912; it was a mile in 1 minute 58 seconds. Lou Dillon trotted a mile behind a wind shield in the same time. The pacing record in a race was set by Minor Heir in 1910 at 1:59, although Dan Patch, in 1906, in an exhibition heat, covered a mile in 1:55. The running record is the fastest of all; it is 1:37¼ for a mile, and was made in competition by Kildeer over a straight course in 1892. Dick Welles in 1903, Kiamasha in 1905 and Fern L. in 1908 covered the distance in 1:37 2-5.

The famous English Derby has been held at Epsom, England, near London, almost every summer since 1780. It is witnessed by sportsmen from all parts of the world and is made a fashionable society event. The same is true of the so-called Derby races in different parts of America, as at Brighton Beach, L. I.

Races of Men. It is a difficult matter to classify mankind, for there is scarcely any one

characteristic belonging exclusively to a single race, though climate and other influences have modified the structure of certain races to such an extent that they are easily recognized as differing from other races in distant localities. Scientists have offered many classifications, but none has yet appeared to be altogether satisfactory. The one most generally known is that made by Blumenbach, near the beginning of the nineteenth century. The chief basis of his classification was the color of the skin, the shape and size of the head and peculiarities of the features. Blumenbach recognized five distinct races, namely, the Caucasian race, the Mongolian race, the Malay race, the Negro race and the American, or Red, race.

CAUCASIAN RACE. This term was first used by Blumenbach, who believed this to be the original race from which the others were derived. He gave it the epithet of Caucasian because he believed that in its highest physical perfection it was to be met with among the mountaineers of the Caucasus. In later classifications this race is usually divided into Aryan, or Indo-European, and Semitic. The Caucasian race controls all of Europe, Africa north of the Sudan, southern and western Asia, America and Australia. In color Caucasians are white, or light, and have straight or wavy hair and variable skull and features. Yet the diversities in the race are numerous, and very many types may be found between the light-haired, blue-eyed inhabitants of Scandinavia and the almost black tribes of the Great Desert. The Caucasian race has given to the world the three religions that teach there is but one God, namely, the Christian, which follows the Bible; the Jewish, which rejects the New Testament, and the Mohammedan, which has for its sacred book the Koran.

Two branches of this race are recognized, the South Mediterranean and the North Mediterranean. The former branch is composed of two stocks, the Hamitic, of which the Libyans and Egyptians are types, and the Semitic, of which the Arabs, Abyssinians and Hebrews are types. In the North Mediterranean branch the Basques are considered a stock by themselves, as are also the peoples of the Caucasus. The great stock of this branch, however, is the Aryan, and in this the peoples are grouped under different heads, of which the leading are the Teutonic, including the Germans, English and Scandinavians; the Slavonic, including the Russians, Poles, Czechs and Bulgarians; the Indo-Iranic, including the Persians and Hindus; the Hellenic, including the

Greeks and Latins, and the Celtic, of which the Highland Scotch and the Irish are types. Articles treating of the several peoples will be found in their proper places in the text.

MONGOLIAN, OR YELLOW, RACE. The Mongolians have flat faces, short skulls, coarse hair, yellowish skin and small, black eyes, slanted downward toward the nose; they are usually under the average height. The Chinese, who include one-fourth of the people of the world, are the largest nation, but the Japanese have proved themselves by far the most progressive of the Mongolians. Many of the interior tribes of Asia are still densely ignorant and seem to have little capacity for acquiring knowledge. The Mongolian race is distributed over the greater part of Asia and the islands of the Northern Pacific. The more recent writers consider the Eskimo as Mongolian. For further information on the Mongolian race, consult the articles on leading peoples in their proper alphabetical positions in this work.

MALAY, OR BROWN, RACE. This race inhabits the Malay Peninsula and the Asiatic Archipelago. In physical appearance, Malay peoples are under middle height; they are light brown in color and have black, straight hair, high cheek bones, black and slightly oblique eyes and little or no beard. Most of them are strong, fierce savages, treacherous and deceitful in disposition and bitterly opposed to encroachments from the civilized peoples. Many writers do not follow Blumenbach in making of the Malays a distinct human race, thinking them to be merely a variety of the Mongolian race.

NEGRO, OR BLACK, RACE. This branch of the human family is composed of those people who have a brownish or black complexion, broad, flat nose, thick lips, woolly hair and long skulls. The true negroes are found in the Sudan, while south of them are the Bantu group, as well as the dwarfish Bushmen, the Hottentots and the dwarfs of the Kongo. The latter are called negroids and differ widely in languages and customs from the typical negroes. The black natives of Australia and Papua are sometimes classified as negroids and separated from the Malay race. As a rule, negroes differ from the whites as much in mental characteristics as in physical ones, though there are individual exceptions. The negroes are of a superstitious temperament, believing in witches, charms and evil spirits. In general, they are lively, excitable, passionate and fond of music and display. Unless taught by other races, no negro tribe has ever developed a civilization.

At one time negroes were taken in large numbers from Africa, transported to other countries and sold as slaves. It is estimated that about 10,000,000 negroes were thus taken from their native land. In consequence there are many negroes now living in the United States, in Europe and in other parts of the world. In the United States many of the negroes have, since their liberation as a result of the War of the Rebellion, acquired good educations and hold responsible positions (See NEGRO, EDUCATION OF THE).

AMERICAN, OR RED, RACE. See INDIANS, AMERICAN.

Rachel, *ra shel'*, MADEMOISELLE (1821-1858), a French tragic actress of Jewish parentage, whose real name was Elizabeth Rachel-Felix. For a time she gained her living by singing in the streets of Lyons, but her voice attracted attention, and she was enabled to receive a course of instruction at the conservatory. In 1837 she made her début in Paris, but attained no special success until the following year, when she took the Parisian public by storm by the admirable manner in which she presented the plays of Racine and Corneille. Her renown continued to increase, and for many years she reigned supreme at the Théâtre Français, making also tours to the provincial towns of France and to Belgium. Later she visited America. Rachel's greatest success was in the title rôle of Racine's *Phèdre*, and it is doubtful whether her work in that part will ever be excelled on any stage.

Racine, *ra seen'*, WIS., the county-seat of Racine co., 23 mi. s. of Milwaukee, on Lake Michigan, at the head of the Root River, and on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. The city is regularly laid out, on an elevation of about 40 feet above the lake. It has a good harbor and conducts a large trade in farm products and manufactured goods. Racine is an important manufacturing center, producing agricultural implements, wagons, flour, boots, shoes, trunks, valises and various foundry, machine shop and lumber mill products. It contains the Saint Luke's Hospital, Taylor Orphan Asylum, Racine College, Saint Catherine's Academy, a public library, and college and Y. M. C. A. libraries. It was settled in 1834 and was chartered as a city in 1848. Population in 1910, 38,002.

Racine, JEAN (1629-1699), a great French tragic poet. His earliest play, *La Thébaïde*, dealing with the struggle between Polynices and Eteocles, was performed by Molière's troupe at

the Palais Royal in 1664, as was also his next, *Alexander the Great*. The first of his great plays was *Andromaque*, which on its performance at the Hôtel de Bourgogne, in 1667, produced a profound impression. Within ten years after the appearance of *Andromaque*, Racine produced *Britannicus*, *Berenice*, *Bajazet*, *Mithridates*, *Iphigenie* and *Phèdre*. In 1673 he obtained a seat in the French Academy. His withdrawal from the theater in 1677 was due partly to chagrin at the success of a hostile party of theatrical critics, who applauded a rival, and partly, perhaps, to religious motives. At this period his friends persuaded him to marry, and soon after he was appointed, along with Boileau, historiographer to the king, whom he accompanied in his campaign to Flanders. The only dramatic works he produced after 1677 were *Esther* and *Athalie*. The latter, at least, is ranked among Racine's greatest works.

Rack, an instrument for the judicial torture of criminals and suspected persons. It was a large, open, wooden frame, within which the prisoner was laid on his back upon the floor, with his wrists and ankles attached by cords to two rollers, one at each end of the frame. These rollers were moved in opposite directions by levers till the body rose to a level with the frame; questions were then put, and if the answers were not deemed satisfactory, the sufferer was gradually stretched till the bones started from their sockets. It was formerly much used by civil authorities, in the cases of traitors and conspirators, and by the members of the Inquisition, for extorting a recantation of heretical opinions.

Radcliffe, ANN WARD (1764-1823), an English novelist, born in London. She was married at the age of twenty-three to William Radcliffe, afterward editor and proprietor of the *English Chronicle* newspaper. She published in quick succession *The Castles of Athlin and Dunbayne*, a Highland story; *A Sicilian Romance*; *The Italian*; *The Romance of the Forest*, and *The Mysteries of Udolpho*, which was long very popular.

Radcliffe College, an educational institution for women, founded at Cambridge, Mass., in 1879, by the Society for the Collegiate Instruction of Women. It was at first known as the Harvard Annex, though it had no official relations with Harvard University until 1894, when by act of the General Court of Massachusetts its name was changed to Radcliffe College, in honor of Ann Radcliffe, the first woman to give a money endowment to Harvard. The require-

ments for admission and for degrees are identical with those of Harvard College, and the courses of instruction, which in the main are duplicates of those in Harvard College, are given for the most part by members of the Harvard University faculties. The attendance is about 600.

Radia'ta, the name of Cuvier's fourth division of the animal kingdom, no longer recognized, now divided into Protozoa and Coelenterata.

Radiolaria, a family of protozoans, which produce a flinty shell or small, hard projections and whose pseudopodia, or extensions of protoplasm, stand out in the form of a star. See PROTOZOA.

Ra'diometer, an instrument used for detecting the radiation of heat. The most common radiometer consists of four aluminum disks, arranged at right angles to each other and attached to a vertical axis, upon which they revolve. This apparatus is enclosed in a bulb-shaped tube, from which the air has been practically all exhausted. One side of the aluminum disk is coated with lamp-black, while the other side is bright. The dark side of the disk receives the heat rays and radiates them. The reaction of this radiation causes the disks to revolve. This instrument is very sensitive. Lighting a match near one or even bringing the hand close to it will cause the disks to revolve rapidly.



RADIOMETER

Radish, a well-known plant of the mustard family, cultivated for its edible roots, but unknown in a wild state. It is a native of Asia, but now flourishes in all temperate regions. It grows to about three feet in height and bears nearly white flowers, on a branched stalk. Some species are annual, and some are perennial. The roots of some varieties are globular in form, those of other species are elongated, and in certain species the roots are white, while in others they are red. The seeds are sown in rows about a half-inch apart, and they mature in from three to five weeks. Often three or more crops can be raised in a season.

Radium, an element discovered by Professor Curie and his wife, Madame Curie, at the Industrial School of Physics and Chemistry in Paris. In 1896 it was found that uranium and all its compounds continually emit radiations and have a penetrating power similar to that of the X-rays. Professor and Madame Curie

followed this discovery with a series of experiments on the ore of uranium, commonly known as pitchblend, and they obtained a pure radium chloride in 1902. The excessive rarity of radium may be judged by the fact that Mme. Curie obtained only about 0.2 gram from a ton of uranium residue. It has been found by experiment that 10,000,000 parts of uranium by weight contain 3.4 parts of radium. The price of radium has fluctuated considerably, the maximum being about \$120,000 a gram of the pure metal. At this figure a pound of radium would be worth over \$50,000,000. As the world's annual production of radium is only about 3 grams, it will be about 150 years before the world's supply is one pound, unless the rate of production greatly increases. Austria is the greatest producer of radium-bearing ores, but Colorado and Utah have considerable deposits which are now being mined. In 1913 it was announced that some of the Saratoga springs showed radio-activity due to the presence of radium salts in solution. Most of the ore mined in the United States is shipped to Europe. There are only two commercial plants in the United States where radium is being extracted from uranium; these are both in Pennsylvania.

For a number of years after its discovery radium had little interest for the general public. Becquerel, the French scientist, found that radium rays were invisible, would penetrate thin sheets of glass or metal, and could not be refracted (see REFRACTION). The action of radium on the human body was unknown until 1901, when Becquerel noticed that a burn appeared on his skin under the waistcoat pocket in which he had carried a tube containing radium. This accident led to continued experiments with the purpose of using radium in medicine. Today it is used in curing many skin diseases, ulcers, tumors, and above all, cancer.

Radium rays are compound. By the use of various filters, including gold, silver, platinum, aluminum and rubber, radium rays are divided into three distinct kinds, known as the *alpha*, the *beta* and the *gamma* rays. As the *alpha* rays are soft and very destructive to tissue, they are used to best advantage in surface cancer and skin diseases. They cannot penetrate a sheet of paper. The *beta* rays are more penetrating, or harder, and are capable of acting through sheets of aluminum or glass several millimeters thick. The *beta* rays are being used for deep tumors and also for cancer. The *gamma* rays which are the most penetrating, seem in some

way dependent on the beta rays; they are supposed to be a type of radiation like that of Roentgen or X-rays.

Radium produces a gas, technically called emanation, which is more active than radium itself and possesses the same properties. The gas rapidly loses its strength, however, and at the end of a little less than four days its activity is only one-half. The radium emanation may be collected and stored for a month or more without losing its properties. The practical uses of radium are greatly increased by this fact, for a supply of radium emanation can be obtained for a small fraction of the cost of the radium itself. Another remarkable property possessed by radium is that of impregnating another body with its properties. The surface of a body placed near radium, or better still, immersed in the emanation, acquires radio-activity. As in the case of the gas, this power gradually decreases; but while it lasts, it has the characteristics of the metal. Radium emanations and substances saturated with emanations are being used by physicians in place of pure radium.

Raff, *rahf*, JOACHIM (1822-1882), a musical composer, born in Switzerland. He was encouraged by Mendelssohn and Liszt, and his opera *König Alfred* was first performed at Weimar, at the Court Theater, under Liszt's direction. His reputation rests chiefly on his symphonies, especially *Im Walde* and *Lenore*.

Raffia, a strong fiber obtained from the Jupati palm of South America. It is used largely in the United States, especially in nurseries and greenhouses, for tying up plants. It is also woven into matting for decorative purposes. In the schools of the United States, raffia weaving has become an important branch of kindergarten work. The fiber is woven by the natives of South America into cloths, from which almost all their clothing is made.

Ragnarok, *rahg na rök'*, literally *judgment of the gods*, but usually taken as meaning *twilight of the gods*, a time which the northern people believed must come, when the great gods should come into mortal conflict with the powers of evil and should be overthrown; when the dwellings of the gods should be destroyed and all earth should be desolated. It was believed, however, that although the most of the great gods were to be killed by the powers of evil which would be let loose when Ragnarök came, a new generation of gods would arise who were to rule over a new and purer heaven and earth.

Rags, though valueless for most purposes, are yet of great importance in the arts, particularly in paper making. Besides the rags collected in the United States, others are imported in large quantities from various foreign countries. Woolen rags of a loose texture, and not too much worn, are raveled by means of machinery and mixed up with good wool, to form what is known as *shoddy*, from which cheap woolen goods are made. See SHODDY.

Rag'weed, an annual weed, common in rich, damp soils. It is found in Europe and receives its name from the ragged appearance of its leaves. The flowers are small and golden yellow in color. The *great ragweed* is a species confined to southern, central and eastern states. Its flowers grow in great clusters and are commonly found by the side of roads and in pastures. Other names often applied to this weed are *bitterweed*, *hogweed* and *Roman wormwood*.

Rahway, *raw'way*, N. J., a city in Union co., 20 mi. s. w. of New York City, on the Rahway River and the Pennsylvania railroad. It is a fine residence place and has parks and a public library. It contains a large printing house and manufactories of steel castings, chemicals, felt goods, music boxes, electrical supplies and other articles. There is also a large trade in fruit and vegetables. Population in 1910, 9337.

Raikes, *rayks*, ROBERT (1735-1811), an English publisher and philanthropist. He was proprietor of the *Gloucester Journal*, which he used in effecting reforms. He is chiefly remembered because he originated the Sunday-School, by gathering together a number of street children for secular and religious training.

Rail, the general name for a number of birds which have long bills, often more or less curved



RAIL

at the tip and compressed at the sides, short tails and comparatively short legs. Most of the members of this family frequent the marshes, though a few species are found on dry soil. Besides the rails proper, the coots, water hens and crakes are members of the family. Though some of them

are very good swimmers and divers, all are rather poor upon the wing. Several are much hunted because of their delicate flesh. In the United States, the *clapper rail*, the *king rail* and the *Virginia rail* are the most common representatives of the true rails. For the egg of the last, see BIRDS, *color plate*. See also COOT; CORN CRAKE.

Railroad or Railway, a road having parallel lines of iron or steel rails fastened to a roadbed, for the passage of wheeled vehicles constructed to fit the road. Railroads were known in the days of the Romans, and the tracks consisted of two lines of dressed stone, laid end to end, so as to provide a continuous stone way. The first attempt at the construction of railways like those in use at the present time was made in England as early as 1602. These were made of wooden rails, or beams, laid down for the wheels of wagons used to carry coal from the mines (See TRAMWAY). Later flat strips of iron were nailed to the wooden rails, to protect them from wearing, and in 1767 cast iron rails were introduced. Two years later flat cast iron rails, with an upright flange, to confine the wheels to the track, were invented. In the latter part of the eighteenth century, wrought iron bars, laid on wooden ties, were substituted for the old cast iron rails, and shortly after 1820 the rolled rail, similar to that now in use, was invented. The modern railroad dates from the construction of the Liverpool & Manchester railway, which was completed in 1829. It was upon this line that steam as a motive power was first successfully introduced. See LOCOMOTIVE.

RAILROADS IN THE UNITED STATES. The first railway in the United States was built from the granite quarries in Quincy, Mass., to the coast, and it was designed for conveying stone for the Bunker Hill Monument. This line was completed in 1826, and the cars were hauled by horses. The following year the Delaware & Hudson Canal Company began building a road from Honesdale, Pa., to their coal mines at Carbondale, a distance of sixteen miles. This line was completed and opened for business the same year that the Liverpool & Manchester railway was completed. Horses and stationary engines were used to haul the cars. It was upon this road that the first locomotive used in the United States was placed in service. This locomotive was the *Stourbridge Lion* and was imported from England.

The first railroad built in the United States for the purpose of carrying both passengers and

freight was the Baltimore & Ohio. Construction upon this line began in 1828, and by May, 1830, the first division, extending from Baltimore to Ellicott's Mill, was opened to traffic. For two years horses were employed to haul cars, but after that locomotives were used. The South Carolina road, begun in 1830, was the first line to employ steam as a motive power from the beginning. Following these pioneer lines, numerous others were constructed within the next twenty years. Between 1830 and 1835 about 800 miles of railroad were built in the United States, this being about one-half of the mileage of the world, and from 1835 to the beginning of the Civil War, railroad construction was active throughout the country. In 1842 the New York Central was completed as far as Albany, and the same year the Boston & Albany was completed. Through rail communication between Cincinnati and Lake Erie was established in 1848, and that same year the Pennsylvania Railroad, the beginning of the great Pennsylvania system, was chartered. In 1852 the Michigan Central and the Michigan Southern lines were opened, and the following year the connecting link between Cleveland and Toledo was completed, thus securing through rail communication from the seaboard to Chicago. The Chicago & Rock Island was completed between Chicago and the Mississippi River in 1854, and in the year following, the Chicago & Galena, the beginning of the North-Western system; the Chicago & Alton; the Chicago, Burlington & Quincy, and the Illinois Central were also opened to traffic. In 1855, also, Cincinnati and Saint Louis were connected by the Ohio & Mississippi railroad. In 1858 the Hannibal & Saint Joseph road reached the Missouri River. This was the first road extending beyond the Mississippi.

At the beginning of the Civil War there were about 30,000 miles of railroad in the United States, but during the war railroad construction was practically suspended. However, after the close of the conflict the work was taken up with renewed activity, and in 1869 the first transcontinental railroad line was completed, joining the Atlantic and Pacific oceans (See PACIFIC RAILROADS). From that time on railway construction has kept pace with the development of the country, until at the present time there are in the United States about 244,180 miles of railway lines, exclusive of second tracks and sidings, which include about 115,000 more, making in all about 360,000 miles, which is about one-half of the railway mileage of the world.

Railroad

The following table shows the approximate mileage of the leading countries:

COUNTRIES	MILES
Russia.....	46,025
German Empire.....	38,747
Austria-Hungary.....	33,597
France.....	31,391
Canada.....	25,400
Great Britain.....	23,417
Argentina.....	20,400
Mexico.....	15,804

CONSTRUCTION. In deciding upon the location of a railroad, attention is given to three conditions—the cost of construction, the cost of operating the line and the traffic that may be secured from the adjoining country. The route over which a line can be constructed with least expense may be more expensive, on account of the cost of operation, than another, over which the cost of construction is greater. In many cases, large cities and towns and good mining, lumbering and farming regions must be reached, even at the expense of extending the line. Hence, it is often found that the route chosen is not the most economical at the time of construction, but becomes so in the course of years. When the route is decided upon, two surveys are made, the first for determining the curves and grades, and the second for locating the roadbed and indicating the exact grading. For this purpose stakes are set every few rods along the middle line of the roadbed. Each stake is marked with the number of feet and inches to be cut or filled to make the desired grade. As far as possible, the engineer makes the cuts and fills equal, so that the earth from the one can be used in constructing the other. When earth for filling is not immediately available, a trestle is built across the gap and the filling is done after the road is completed.

For a single track the roadbed is from 18 to 22 feet wide, and for a double track it is from 26 to 32 feet wide. When the grading is completed, the cross ties are put in place and the rails are laid. In the United States, Canada and Great Britain rails are usually laid 4 feet 8½ inches apart, this spacing being known as the standard gauge. Narrower gauges are in use on many mountain railways. Other gauges are still used in various countries, but the 4 feet 8½ inches gauge is becoming common all over the world. The ties are usually of wood 8 or 9 feet long, 6 to 8 inches thick and hewed on two sides, so as to give a surface 6 or 7 inches wide. They are placed from 18 inches to 2 feet apart, and the rails are fastened to them by long spikes, with heads that act as hooks. Iron plates, called

Railroad

chairs, are placed under the ends of the rails, to prevent wearing of the ties, and the rails are joined by plates, called *fish plates*. These are placed one on each side of the web of the rail and are held in position by bolts, which pass through the rail and the plates. A road usually requires about 2500 ties to the mile. The best roads in the United States employ a rail adopted by the American Society of Civil Engineers. As ordinarily made, this rail is 30 feet long and weighs 80 pounds to the yard. It is 7½ inches high and has a head 2½ inches wide and 1½ inches deep, a web 5 inches wide and a little over 1½ inches deep and a base 5 inches wide. On roads where high speed is required and on curves, rails weighing 100 pounds to the yard are frequently used.

When first laid, the track is very rough and uneven, and the next process is that of *ballasting*. This consists of spreading evenly over the roadbed a layer of crushed stone, gravel, sand or earth, to a depth of one foot, in which the ties are firmly imbedded. The ballast is packed so tightly around the ties that it renders them immovable. The outer rail on curves is raised to the height necessary for safety, and side-tracks and switches are put in wherever required.

EQUIPMENT. The equipment of a large railroad system embraces *rolling stock*, the term applied to locomotives and cars; passenger stations; freight depots; shops for building and repairing cars and locomotives; yards for the transfer of freight and the storage of cars; water supply for locomotives; a system of signals for the guidance of trainmen, and telegraph and telephone lines.

The rolling stock consists of locomotives for the passenger and freight service, and the various styles of cars necessary to accommodate traffic. On all lines the passenger service requires baggage, express and mail cars, besides ordinary day coaches. Sleeping cars, dining cars and parlor cars are required on long lines. The first passenger cars in England closely resembled stage coaches, and the first improvement consisted in joining two or more of these into one. Finally, the sides and roof were made continuous; but the cross-partitions, separating the car into compartments, remained, and they still characterize most of the cars in use on English railways. The first passenger cars in the United States closely resembled those of England; but they were soon replaced by the long, box-shaped cars, with an aisle through the middle and a platform at each end, and the best cars now in use are constructed on this plan. A standard passenger

car is from 50 to 52 feet long, weighs from 45,000 to 60,000 pounds and is valued at from \$4500 to \$5500. It is mounted on two six-wheeled trucks and is fitted with a steam or hot-water heating device and with electric or gas lights. A drawing-room car is from 50 to 65 feet long and its value is from \$10,000 to \$20,000.

The first sleeping car was placed on the Cumberland Valley railroad in Pennsylvania in 1837. In 1859 George M. Pullman changed some day coaches on the Chicago & Alton railroad to sleeping cars, and the experiment was so satisfactory that he felt warranted in building a regular *sleeper*. This car was constructed in the shops of the Chicago & Alton railroad and was christened *The Pioneer*. It was completed in the spring of 1865 and served as the funeral car in bringing the remains of President Lincoln to Chicago. Two years later the Pullman Palace Car Company was organized for the purpose of building and operating a system of Pullman sleeping cars on all railroads in the United States. The Wagner Car Company was also organized at about the same time, and for a series of years these firms divided the business between them. Finally, the Wagner Company was absorbed by the Pullman Company, and now Pullman cars are found on nearly all railroads of the United States and on many of the long lines of Europe. A standard sleeper is from 50 to 70 feet long and costs from \$12,000 to \$25,000. Less expensive sleepers, known as *tourist cars*, are also operated on most of the transcontinental lines. See PULLMAN, GEORGE M.

Dining cars came into use on the Great Western Railway of Canada in 1867. The first patterns were a combination of dining and sleeping cars, but in 1868 the Chicago & Alton placed a complete dining car in service. The vestibule car was invented by Mr. Pullman in 1887 and is now in use on all first-class trains.

The modern first-class passenger train, such as the *limited* trains on long lines, consists of a baggage car, one or more day coaches, Pullman sleeping cars, a dining car, a library and smoking car combined, and on day trains, a parlor car. The smoking car usually contains a bath room and a barber shop. The train is heated by steam and lighted by electricity, and it is fitted with the most serviceable safety appliances. See AIR BRAKE.

There are many patterns of freight cars, but the common box car is more generally used than all others. The average length of box cars is 34 feet, and their capacity varies from 20 to 30 tons.

Steam cars having a capacity of 50 tons are used in handling iron ore and coal. Flat cars are used for lumber and other articles too large to put into box cars, and low open box cars, called *gondolas*, are used for hauling coal. There are also special cars for the transportation of live stock, besides *refrigerator cars*, for the carriage of perishable commodities.

ORGANIZATION. The stockholders of a railroad corporation elect a board of directors and thus concentrate delegated authority on a few men. The board of directors elects a president, generally the executive head of the corporation, one or more vice-presidents, a secretary and a treasurer.

In general, on railroads of the United States, the president is the executive head, and vice-presidents are placed in charge of special departments, but in such positions they are assistants to the president. The general manager of the railroad sometimes is also the president, or he may be one of the vice-presidents; but in general he is not an officer of the directorate, is appointed to the position and may be removed by the president. The general manager has charge of the departments relating to the physical care of the properties of the railroad.

The physical departments of a railroad are each in charge of an official who is held accountable by the general manager for the conduct and maintenance of his particular department. The chief engineer, or superintendent of roadway, has charge of the maintenance of the tracks, the bridges and buildings. Under him is a force of assistant engineers. The roadmaster is in charge of that subdivision of the engineering department which relates to bridges and roadway, and under the roadmaster are supervisors of bridges and supervisors of roads, assigned to each division of the railroad. A supervisor of bridges has charge of bridge gangs, each with its foreman, and composed of carpenters, iron workers, masons and laborers. The supervisor of road has his division divided into sections, each section from 4 to 8 miles in length, and on each section is a section foreman, the head of the section gang, composed of track walker, wood and water tenders and laborers.

The superintendent of machinery, sometimes called superintendent of motive power, has charge of the construction and maintenance of the rolling stock of the railroad—locomotives and cars. His department is divided between a master mechanic, who has charge of locomotives and machine shops, and a master car builder, who has charge

of the car shops. The engine men—locomotive engineers and firemen—foremen of machine shops, mechanics and machinists, hostlers and cleaners in the roundhouses and other laborers are under the master mechanic. The master car builder has charge of the shops where cars are built and repaired, and also of the car inspectors, who prevent defective cars from going into trains at central and junction points.

The superintendent of transportation has charge of the movement of trains. He makes all time schedules, and under him are train masters, train dispatchers, telegraph operators, conductors and trainmen.

The car accountant keeps track of all cars belonging to the company, whether on the lines of the owner's railroad or on the lines of foreign roads. He also keeps records of the locations and movements of foreign cars on the railroad. The records are made up from daily reports from freight and passenger conductors and by a system of interchanged reports from car accountants of other roads. He has lost car agents, who travel constantly, searching for and locating missing cars.

The traffic manager has charge of the freight and passenger business, so far as it relates to fixing freight and passenger rates, soliciting business and advertising special trains and excursions. Under him are the general freight and general passenger agents, with their assistants, traveling agents, local agents, rate and division clerks and claim agents.

Each division of the road has its superintendent, who is under the general superintendent, who in turn reports to the general manager. The division superintendent exercises general supervision over everything on his particular division, and to him report the station agents, the yard masters and other employes of his division.

The comptroller is the chief bookkeeper of the railroad, and his department includes the auditor of receipts, auditors of disbursements, traveling auditors, the clerk of statistics, and local treasurers and paymasters, who receive money from the treasurer and disburse it under the direction of the comptroller.

The treasurer makes all payments of dividends and interest under the direction of the president. The purchasing agent buys all material and supplies for the railroad on requisition from heads of departments, and under him are local storekeepers of each division.

The general counsel is at the head of the legal department, and in his department are the attor-

neys assigned to particular branches of the work.

Many roads have an industrial department, organized for the purpose of locating manufacturing plants on the lines of the road. This department is in charge of the industrial commission.

The land commissioner has charge of the lands of the railroad, secured under land grants from the Federal government and from states, counties and cities.

The surgeon of a railroad sometimes is a physician or surgeon who lives on the line of the railroad, but every important railroad company has its own medical and surgical staff. Some railroads have a system of hospitals, in which sick and injured employes are cared for. The company owns the hospital buildings, and the hospital service is maintained by assessments paid in by the employes of the road. Any deficit is made up by the company.

RAILWAY SIGNALING. In order to protect passenger and freight trains and to prevent collisions, railroad lines are divided into blocks, the length of a block varying according to the requirements of traffic. On the line, away from terminals, the blocks are long; near terminals they are shorter. Block signaling may be divided into two classes—absolute block and permissive block. Absolute blocking does not allow two trains to be in any part of the same block on the same track at the same time. In permissive blocking, the trains are spaced by time. When one train has passed into a block, another train is not permitted to enter the same block until a certain time has elapsed; generally the time limit is ten minutes for passenger trains and five minutes for freight trains. On some roads the absolute block is used to protect passenger trains and the permissive block is used to protect freight trains.

Movements of trains from one block to another are guided by block signals, which are operated under three systems—telegraph, controlled manual and automatic. In the telegraph system, a tower is placed at the beginning of each block, and in the tower house is the operator. The towers are connected by telegraph. When a train passes out of one block and into the next one, the telegraph operator at that point notifies the operator in the tower in the rear that his block is clear. The operator then throws his signal to *clear* and thus shows the locomotive engineer of the next train that he has permission to proceed. It also is the practice on some roads for the operator to notify the operator of the tower ahead that a train has entered the block.

In this system it is necessary for the operators to be vigilant and accurate, for the success of the system depends entirely upon their faithfulness.

The controlled manual system is an improvement on the telegraph block. It is a telegraph block in itself, but an interlocking system, operated by electricity, prevents the operator in the rear from throwing his signal to clear until the operator in advance has signaled the passage of the train from out of the block.

In the automatic system, the train itself sets or releases the signals by means of electricity. Each block is electrified, through its rails, and at the same time it is insulated from connecting blocks. Each block is also electrically connected by line wire with the block on each side, and in some instances with the second blocks on each side. For instance, suppose three blocks, each a mile long, A, B and C. A train enters block A. At once the semaphore at the beginning of the block comes to the position designating *stop*. This sometimes is called the danger signal. Above this semaphore is another one, and it also rises to the horizontal position, so that both semaphore blades are at the danger position. The train proceeds, and leaves block A for block B. As it does this, it sets both semaphores there at danger, and releases the upper semaphore of block A, so that it drops. This shows that block A is clear, but that the train is in block B. The train, proceeding, leaves block B for block C. At once the two semaphores at block C come to danger: the lower semaphore of block A drops so that both semaphore blades there are *clear* and the upper semaphore at block B drops to clear. This shows that block A is clear with the train not nearer than block C, and that block B is clear with the train in block C, and that block C is *blocked*, because the train is still in it. In this system no train can follow another closer than two blocks.

There are three forms of signals used in the automatic blocking—the semaphore, the revolving banner and the disk. The disk sometimes is called the *banjo* signal, because of its shape. The box has an opening in the front and rear, covered with ordinary uncolored glass. In this box a light is placed. A movable disk, made of red silk, stretched over a light frame, is made to drop in front of the opening, to give the danger signal—the red banner in the day time and the red light at night. An electro-magnet raises the disk and when the circuit is broken by a train, the disk drops. The banner signal is operated by clock work, but is controlled by electricity.

All signals are classed under two heads, home and distant. When the home signal is at its danger position, it means stop; when the distant signal is at its danger position, it means caution. The home signal semaphore has the end of its arm square; the distant signal is a semaphore arm with a notch cut in the end; this is called a fish-tail semaphore. The home signal at night shows a red light for danger and a white light for safety; the distant signal for night shows a green light for caution and a white light for safety, except on those roads where red indicates danger, green clear and a combination of red and green caution. See SEMAPHORE.

When signals and switches are so arranged that their movements are made dependent on each other, the system is called *interlocking*. In the interlocking switch and signal system, all the switches in the group are operated from a tower by the operator of the interlocking machine. The principle of interlocking is that no signal can be shown to indicate that the track is clear until the switches are properly set. That is, the switching is done first, and until that is done and properly done, the operator cannot show the clear signal. All signals in an interlocking system are normally set at danger. The interlocking machine is a system of levers, which are connected, by means of pipe rods and bell cranks, with the switches. The operator in throwing switches to clear a certain route for a train interlocks the levers controlling opposing switches in such a manner that such switches cannot be moved. This is done in the machine itself and prevents the operator from laying out conflicting routes. Switches and signals often are worked at such a distance from the tower that the operator cannot see the signals. In such cases electrical annunciators tell the operator if the contemplated movements of switches have been made.

CONSOLIDATION OF RAILROADS. The first railroads were short lines and were built with little thought of connecting with other lines. This caused numerous annoyances. Freight shipped over different lines had to be reloaded at each terminus, and passengers were required to change cars frequently. Originally no fewer than six separate railroads composed what is now the New York Central, extending from New York City to Buffalo, and this condition characterized most other lines in the country. The first movement toward uniting these roads into a system consisted in making a traffic arrangement, by which the different companies agreed to haul each other's cars over their lines. As the roads

Rain

extended westward and the movement of freight became more complicated, transportation companies were formed for the purpose of handling through freight. These companies owned their cars and made contracts with the different railroads for hauling. The success of these combinations led the stockholders of connecting lines to unite their roads under a single corporation. Since 1870 most of the long lines east of the Mississippi have been formed in this way. One object of these combinations was to prevent competition and thus to enable the roads to maintain rates; but the Supreme Court of the United States decided that such agreements were in restraint of trade and consequently violated the section of the Interstate Commerce Act forbidding such combinations. Even before this decision, plans were made for consolidating competing lines into systems, so that in 1915 most of the railway mileage was controlled by the following organizations, denoted in most cases by the name of the man or men who hold controlling interests:

	MILES
Vanderbilt System.....	25,970
Pennsylvania.....	21,312
Morgan Interests.....	13,987
Gould Interests.....	22,114
Harriman Interests.....	22,410
Hill Interests.....	14,112
Moore-Reid Interests.....	29,110
Rockefeller Interests.....	17,934
Other Systems.....	59,000

In the belief that this consolidation and other industrial conditions had led to the charging of unfair rates, especially through partiality to certain shippers and certain sections, an agitation was begun for government regulation of railroad traffic. State railroad commissions were organized, but they found it difficult to control traffic within their respective states, without interfering with interstate traffic, which was beyond their province. Consequently, the national Congress enacted a law in 1906, designed to compel railroad companies to abandon the practice of giving rebates to shippers.

See INTERSTATE COMMERCE COMMISSION; also BRIDGE; TUNNEL. Consult Johnson's *American Railway Transportation* and Hadley's *Transportation: Its History and Its Laws*.

Rain, water falling from clouds in drops. Rain depends upon the formation and dissolution of clouds. The invisible vapor suspended in the atmosphere, which forms clouds and is deposited in rain, is derived from the evaporation of water, partly from land, but chiefly from the vast expanse of the ocean. At a given temperature the atmosphere is capable of containing

Rain

no more than a certain quantity of vapor, and when this quantity is present, the air is said to be *saturated* (See CLOUD). Air may at any time be brought to a state of saturation by a reduction of its temperature; and if air is cooled below a certain point, the whole of the vapor can no longer be held in suspension, and a part of it is condensed and is deposited in dew or floats about in the form of clouds. If the temperature continues to decrease, the particles of vapor composing the cloud will increase in number and begin to descend by their own weight. The largest of these, falling fastest, will unite with the smaller ones they encounter during their descent, and thus drops of rain will be formed, of a size that depends on the thickness, density and elevation of the cloud. The point to which the temperature of the air must be reduced in order to cause a portion of its vapor to form clouds, or dew, is called the *dew point*.

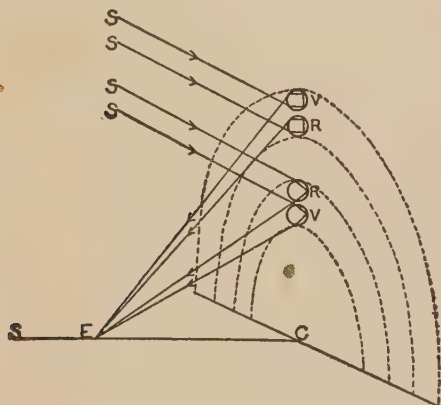
The average rainfall in a year at any given place depends on a great variety of circumstances, the most important of which are latitude, proximity to the sea, elevation of the region, configuration of the country and exposure to the prevailing winds. When the vapor-laden atmosphere is driven toward mountain ranges, it is forced upward by the latter and is consequently cooled, partly by coming into contact with the cold mountain tops, and partly by the consequent expansion of the air, due to the greater elevation. As the temperature is lowered, the moisture is condensed and falls as rain or snow. The presence or absence of vegetation has also considerable influence on the rainfall of a district. Land devoid of vegetation has its soil intensely heated by the fierce rays of the sun; the air in contact with it also becomes heated and is able to hold more and more moisture, so that the fall of rain is almost impossible. On the other hand, land covered with an abundant vegetation has its soil kept cool and thus assists in condensation. Winds carry water vapor a long distance, and when they blow inland, free from the obstruction of mountains near the coast, as in the valley of the Amazon, they cause rain to fall over extensive regions in the interior of a continent.

Although more rain falls within the tropics in a year, yet the number of rainy days is less than in temperate climes. Thus, in an average year there are eighty rainy days in the tropics, while in the temperate zones the number of days on which rain falls is about one hundred sixty. At the equator, the average yearly rainfall is estimated

Rainbow

at 95 inches. At a few isolated stations the fall is often very great. At Cherrapunjee, in the Khasia Hills of Assam, 615 inches of rain fall in the year, and there are several places in India with a fall of from 190 to 280 inches. The rainfall at New York is 43 inches; at Washington, 41 inches; at San Francisco, 22 inches; at Sitka, Alaska, 90 inches. See UNITED STATES, Map, *Annual Rainfall*.

Rain'bow. The rainbow is formed by the refraction of the sun's rays by drops of water; it can be seen only when the sun is shining upon the rain. The rain drops act like a prism and separate the rays into their prismatic colors (See LIGHT, subhead *Spectrum*). Each color is formed by rays that reach the eye at a given angle, and this angle never changes for the same color; hence, the bow appears circular. The observer, *E*, stands upon a line, *SC*, which, if projected, would pass through the center of the circle. The rays, *s s s s*, are reflected and refracted differently in the upper and lower drops. This gives rise to two bows, one within the other, with the colors in them reversed. In the inner and brighter bow, which is called the *primary*, the red is on the outside and the violet on the inside of the arch, and in the outer and dimmer one, the *secondary*, the



violet is on the outside and the red on the inside. The difference in brightness and the reverse of colors is caused by the different ways in which the drops reflect and refract the rays of light, as shown in the figure.

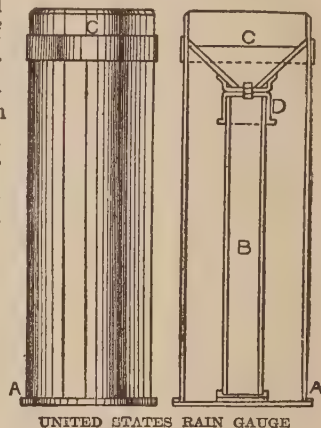
Rain Crow. See Cuckoo.

Rain Gauge, gage, an instrument for measuring the depth of rainfall at any one time. The rain gauge in use by the United States Weather Bureau has two cylinders, one within the other. The inner cylinder, *B*, is attached to a funnel-shaped receiver, *C*, whose area is ten times the

Raisin River

area of the cylinder. A small opening at *D* allows the water to flow into the outer cylinder, *A*, should the amount of rain more than fill the small cylinder. The instrument is accompanied by a

rule, graduated in tenths of inches. A rainfall of one inch will give a depth of ten inches in *B*. Whenever the rainfall more than fills *B*, the water in the small cylinder is measured first, and recorded. Then this is poured upon the ground and the water



in *A* is poured into *B* and measured. The rainfall is one-tenth the number of inches in the two measures. The rain gauge should be so placed that it will be away from trees, buildings or other high objects so that the rain falling upon it will be neither more nor less than that falling upon an equal area in any part of the locality.

Rainy Lake, a body of water forming part of the boundary between Minnesota and Ontario. It is about 50 miles long and is of varying breadth. It receives the waters of numerous small lakes from the east and northeast, and it empties itself by Rainy River, about 100 miles long, into the Lake of the Woods.

Raisin, ra'z'n, River, MASSACRE OF, a famous massacre that was committed during the War of 1812 at Frenchtown (now Monroe), Mich. General Winchester, under orders from General Harrison, took up a position on the Maumee River, and sent a detachment of Kentucky troops to drive the British from Frenchtown. This was successful, and he advanced into the village with his whole force. There he was surprised by a British and Indian force of 1500, under Proctor, and he finally surrendered, with assurance of protection from the Indians. The able-bodied men were taken to Fort Malden, but the sick and wounded were left in the town. Immediately after the departure of the British and their prisoners for Malden, the Indians fell upon those who were left behind, killing nearly four hundred and taking the rest prisoners. The cry, "Remember the River Raisin," was long an

Raisins

inspiration for daring and revengeful feats among the American troops.

Raisins, the dried fruit of various species of vines, comparatively rich in sugar. They are dried by natural or artificial heat. The natural and best method of drying is by cutting the stalks half through when the fruit is ripe, allowing the finest grapes to shrink and dry on the vine by the heat of the sun. Another method consists of plucking the grapes from the stalks, drying them and dipping them in a boiling lye of wood ashes and quicklime, after which they are exposed to the sun upon hurdles of basket work. Those dried by the first method are called raisins of the sun, or *sun-raisins*, *muscatels* or *blossoms*; those by the second, *lexias*. The inferior sorts of grapes are dried in ovens. Raisins are produced in large quantities in southern Europe, in Egypt, in Asia Minor and in California. A kind of raisins without seeds, from Turkey, are called *sultanas*. The *Corinthian raisin*, or currant, is obtained from a small variety of grape peculiar to the Greek islands. See **GRAPE**.

Rajah or *Rājā*, *rah'ja*, in India, originally, a title which belonged to those princes of the Hindu race who, either as independent rulers or as feudal vassals, governed a territory; subsequently the title was bestowed by the native governments, and in later times it was given by the British government to Hindus of high rank. It is now not unfrequently assumed by the *zemin-dars*, or landholders, the title *maharajah* (great rajah) being in our day generally reserved to the more or less powerful native princes.

Rajputana, *rahj poo tah'na*, a division of British India, bounded on the east and southeast by the United Provinces of Agra and Oudh, on the southwest and west by Bombay and on the north by Bahawalpur and the Punjab. It includes the British district of Ajmere-Merwara and twenty autonomous states, each under a separate chief; its area is 127,540 sq. mi., and its population in 1911 was 10,530,432. Rajputana is intersected by the Aravali Mountains, to the north of which the country is desert. The soil is remarkably saline, containing many salt springs and salt lakes, and much of the well water is brackish. To the south of the range the country is more fertile. The chief industry of the country is agriculture, and cereals and cottons are grown. The water supply is very uncertain, however, and famines are not infrequent. The dominant race, though not the most numerous, is the Rājput. They are the aristocracy of the country; and to a large extent they hold the land,

Raleigh

either as receivers of rent or as cultivators. They are essentially a military people, and many of their institutions bear a strong resemblance to the feudal customs which prevailed in Europe in the Middle Ages (See **FEUDAL SYSTEM**). The entire province is under the suzerainty of Great Britain.

Rajputs, *raj poots'*. See **RAJPUTANA**.

Rake, a tool used by farmers for collecting hay and grain after mowing and by gardeners for smoothing the ground. The simplest rake has a head and a long, straight handle. The head is a bar of wood or iron, about two feet long set with teeth, which are three or four inches in length and are placed parallel to each other, two or three inches apart. The handle is attached at the middle of the head and extends crosswise to it. Horse rakes are drawn by a horse, but they are modifications of the simple handrake. They are usually mounted on wheels and are worked by a lever, in the hands of the driver. They are from eight to ten feet long.

Raleigh, *raw'ly*, N. C., the capital of the state and the county-seat of Wake co., 148 mi. n. w. of Wilmington, on the Southern, the Seaboard Air Line and other railroads. The city is situated on an elevation of over 300 feet, in the upper valley of the Neuse River. The state capitol is a granite structure and occupies a prominent site on Union Square, near the center of the city. Other places of interest are the Confederate and National cemeteries, Pullen Park and the large state agricultural experiment farm. The educational institutions include the state college of agricultural and mechanic arts, Baptist University for Women, Peace Institute, Saint Mary's School, Saint Augustine Normal School and Collegiate Institute, and Shaw University. There are large state and supreme court libraries and the Raney Public Library. Some of the charitable institutions are the state asylum for the insane, the state institutions for the deaf, dumb and blind and two orphanages. Other prominent buildings are the governor's mansion, the state penitentiary, the supreme court building, the state geological museum, the Federal building, the old Yarborough and the Park hotels, the Tucker and other business blocks.

The city has an extensive trade in cotton, tobacco and general produce and contains a large spinning mill, gingham and other cotton goods factories, underwear and hosiery works, oil mills, phosphate works, cigar factories, car works and various other industrial establishments. The site of the city was chosen for the capital in 1792,

Raleigh

was laid out the same year and was named in honor of Sir Walter Raleigh. The legislature first met here in 1794. The city was occupied by Sherman's army during a part of 1865. Population in 1910, 19,218. The suburbs adjoining the corporate limits are estimated to form a total business and social community of 20,000 people. Consult Battle's *The Early History of Raleigh*.

Raleigh or **Ralegh**, **WALTER**, Sir (about 1552-1618), an English navigator, warrior, states-



SIR WALTER RALEIGH

man and writer, born in Devonshire. He studied at Oxford, and at the age of seventeen he joined a body of gentlemen volunteers, raised to assist the French Protestants. Little is known of his adventures for some years, but in 1580 he distinguished himself in the Irish rebellion. He now became a favorite at court; according to tradition, this was because he threw his embroidered cloak into the mud, in order that the queen might pass. In 1584 he obtained a charter of colonization and made repeated unsuccessful attempts to colonize Virginia. In 1584, also, he obtained a large share of the forfeited Irish estates and introduced there the cultivation of the potato. In 1588 he rendered excellent service against the Spanish Armada, and subsequently vessels were fitted out by him to attack the Spaniards.

To discover the fabled El Dorado, or region of gold, Raleigh planned an expedition to Guiana, in which he embarked in 1595. He

Rameses

reached the Orinoco, but was obliged to return after having done little more than take formal possession of the country in the name of Elizabeth. In 1596 he held a naval command against Spain, under Lord Howard and the earl of Essex, and he assisted in the defeat of the Spanish fleet and the capture of Cadiz.

James I, on his accession in 1603, had his mind poisoned against Raleigh, whom he deprived of all his offices. Accused of complicity in Lord Cobham's treason against James, Raleigh was brought to trial in November, 1603, found guilty and sentenced to death. He was, however, reprieved and confined to the Tower. Here he remained for twelve years, devoting himself to scientific and literary work. In 1616 he obtained his release by offering to open a mine of gold which he believed to exist near the Orinoco. The enterprise proved disastrous. Raleigh's force had attacked the Spaniards, and on his return James, to favor the Spanish court, determined to execute him on his former sentence. After a trial before a commission of the privy council, he was put to death. As a politician and public character Raleigh was unscrupulous, like the age in which he lived, but in the capacity and vigor of his mind, he had few equals, even in an age of great men.

Ramayana, *ra mah'ya na*, a great epic poem of India, written largely by Valmiki. It is one of the great epics of the world. The event with which it chiefly deals is the capture by Rama, king of Oudh, of a kingdom called Lanka, which is probably Ceylon.

Ramee, *ra may'*, LOUISE DE LA (1840-1908), an English novelist, better known under her pen name, *Ouida*. She published a large number of sentimental melodramatic novels, which were very popular. Among them are *Held in Bondage*, *A Dog of Flanders*, *Two Little Wooden Shoes* and *Street Dust*.

Rameses II, *ram'e seez*, (about 1340-1273 B. C.), the greatest of the twelve Egyptian kings of that name, identified with the Sesostris of Greek writers. He was the third king of the famous nineteenth dynasty and was a powerful ruler, a great builder and a successful warrior. His first achievement was the subjection of Ethiopia, and one of his greatest expeditions was that in which he defeated a confederacy of which the Hittites were the head. At Tanis, his chief residence city, he built a granite temple, which contained a colossal statue of himself, and he left many other monuments and temples. Until recently it was believed that it was for his build-

Ramesseum

ings that the Israelites were compelled to make "bricks without straw," but modern research has revealed the fact that the exodus from Egypt took place before his time. The mummy of Rameses II was discovered some years ago at Thebes.

Ram'esse'um, a temple built by Rameses II, on the west bank of the Nile at ancient Thebes, and dedicated to Ammon. It is now in ruins, but enough remains of it to show its grandeur.

Rameswaram, *rah mes'wa rum'*, a low, sandy island in the Gulf of Manar, between the mainland of India and Ceylon. It is about 11 miles long and 6 miles broad, and it contains one of the most venerated Hindu temples in India, the resort of thousands of pilgrims. Population, 17,854.

Ramie, *ram'e*. See BOEHMERIA.

Ramsay, *ram'zy*, DAVID (1749-1815), an American physician and historian, born in Pennsylvania. He served as surgeon during the Revolutionary War, was a delegate to the Continental Congress from 1782 to 1786 and a member of the South Carolina legislature for many years. He was shot by a lunatic. His chief works are *History of the Revolution in South Carolina*, *History of the American Revolution*, *History of the United States and Life of Washington*.

Ranching, the name given in the United States to an occupation carried on in the western part of the country. A ranch is a large tract of land devoted to the breeding of cattle. The peculiar character of the life of those who have these ranches in charge has largely disappeared before the advance westward of closely settled communities, but in the earlier days, and to a lesser extent at the present time, the outdoor life, with its risks and adventures, reared a class of care-free, hardy, temperate and bold ranchmen, who, known as cowboys, peculiarly typified the spirit of frontier life.

Ran'dall, SAMUEL JACKSON (1828-1890), an American statesman, born in Philadelphia and educated at the University Academy. He was at first a prominent Whig, but joined the Democratic party and entered the state legislature. He served for a time in the Union army, but in 1862 he was elected to Congress and was continuously reelected until his death. He was early acknowledged to be the leader of the Democrats in the House and was speaker from 1876 to 1881. As such he guided the House through the dangerous crisis of the presidential election of 1876. In his later years he led a minority of his party in opposition to tariff reform and in favor of protection.

Randolph

Randolph, *ran'dolf*, EDMUND JENNINGS (1753-1813), an American statesman, born in Williamsburg, Va., and educated at William and Mary College. He identified himself with the patriot party, served for a time on Washington's staff and in various political capacities in his native state, was a member of the Continental Congress in 1780 and became governor of Virginia in 1786. He was a conspicuous member of the constitutional convention and favored a strong central government, was opposed to numerous provisions of the Constitution and refused to sign it, but later advocated its ratification in Virginia. In 1789 he became first attorney-general of the United States, and five years later he succeeded Jefferson as secretary of state, but resigned in August, 1795, owing to political charges involving his honor, which were probably false. He was one of the foremost lawyers of his time and was a brilliant orator and writer.

Randolph, JOHN, of Roanoke (1773-1833), an American statesman, born at Cawsons, Vir-



JOHN RANDOLPH

ginia. He was a second cousin of Edmund Randolph. He entered the law, but turned his attention to politics, and in 1799 he was elected to Congress, where he became distinguished for his eloquence, wit, invective and eccentricity. For thirty years he was more prominent than any other American politician. He was the Democratic leader of the House of Representatives,

Randolph

but quarreled with Jefferson and opposed the War of 1812; he opposed also the Missouri Compromise and stigmatized its Northern supporters as "Doughfaces." He sided against Jackson on the nullification question. From 1825 to 1827 he sat in the Senate. While in the Senate he characterized the coalition between Clay and Adams as a union of "the blackleg and the Puritan," and the result was a duel with Clay. In 1830 he was appointed minister to Russia. By his will he freed his numerous slaves and provided for their settlement in a free colony.

Randolph, PEYTON (1723-1775), an American statesman, born in Virginia, educated at William and Mary College and in London. He became royal attorney-general for Virginia and was later elected to the House of Burgesses, where he was active in opposition to the policy of Parliament. He was chosen delegate to the Continental Congress and was unanimously elected president of that body. He died suddenly in 1775.

Rangoon, the capital and chief seaport of Burma, is situated on the Rangoon River, about 25 mi. from the sea. Since its occupancy by the British in 1852, Rangoon has undergone such changes that it is practically a new town, and its population has increased fivefold. The principal streets are broad and contain many large buildings and not a few handsome ones. There are the law courts, the postoffices, the Bank of Bengal, the customhouse, the Anglican and Roman Catholic churches, Rangoon College and other buildings. A large and increasing commerce is carried on with British, Indian and Chinese ports; and an extensive trade is conducted with inland towns, as far as Mandalay. The chief exports are rice and teak, and the imports are mainly manufactured goods. A number of rice mills have been erected; there is a government dockyard, and steam tram cars have been introduced. Population in 1911, 293,316.

Rank, the degree of authority and dignity attached to the various officers of the army and navy. The commander in chief is usually the executive head of the nation and commands the entire national force. In the United States the president holds the title under the Constitution, but he exerts his power through his secretaries of war and navy. The general officers of the army commanding bodies larger than a regiment are, in order of rank, the lieutenant general, who commands an army corps of a field army; a major general, who commands a division, and a brigadier general, who commands a brigade.

Ranunculus

At times the title of general has been used to designate the authority second only to the president; but the title has been allowed to lapse with the death or retirement of the man to whom it was granted by a special act of Congress. A regiment is commanded by a colonel aided by a lieutenant colonel; a battalion by a major; a company by a captain, assisted by a first and a second lieutenant. Below the second lieutenant the officers are known as non-commissioned, or warrant, officers, and such are sergeants and corporals.

Under the secretary of the navy, the highest grades are those of admiral and rear admiral. A vice admiral, when such a title is given, ranks second only to an admiral. Other commissioned officers are the captains of ships, commanders, lieutenant commanders, lieutenants, ensigns and midshipmen. The last two are graduates of the naval academy, not yet fully commissioned. The rank of commodore was abolished in 1905. The corresponding ranks in the army and navy are as follows:

ARMY	NAVY
General	Admiral.
Lieutenant General	Vice Admiral.
Major General	Rear Admiral.
Brigadier General	Commodore.
Colonel	Captain.
Lieutenant Colonel	Commander.
Major	Lieutenant Commander.
Captain	Lieutenant.
First Lieutenant	Lieutenant (junior grade).
Second Lieutenant	Ensign.

Ranke, *rahn'ke*, LEOPOLD VON (1795-1886), a German historian. He studied in the University of Leipzig, became a teacher in the gymnasium of Frankfort-on-the-Oder in 1818 and was chosen professor of history at the University of Berlin in 1825. His first published work was a *History of the Romance and Teutonic Nations from 1494 to 1535*. This was followed by *Princes and Peoples of Southern Europe in the Sixteenth and Seventeenth Centuries*; *History of the Popes*; *History of Germany in the Time of the Reformation*; *History of France, Chiefly in the Sixteenth and Seventeenth Centuries*; *History of England in the Seventeenth Century*, besides a number of other works. At the age of eighty he undertook with undiminished vigor to write a history of the world, and a volume of this great work appeared every year until his death.

Ranunculus, the typical genus of the buttercup family. The plants have entire, lobed or compound leaves and white or yellow flowers. The species are numerous and almost exclusively inhabit the northern hemisphere. Almost all the

Raphael

species are acrid and caustic, poisonous when taken internally, and many species, when externally applied, will raise blisters. The various species found in the United States are known chiefly by the common names of *crowfoot*, *buttercup* and *spearwort*.

Raphael Santi, *rah'fa el sahn'te*, (1483-1520), one of the greatest painters that ever lived, often spoken of as the "Divine Raphael," was born at Urbino, Italy. His father was Giovanni Sanzio, a painter of some merit, from whom



RAPHAEL

young Raphael received his first instruction. At the early age of twelve, he was received into the studio of Perugino at Perugia, as one of his pupils, and he continued with that celebrated painter for six or eight years. The pupil was soon permitted to share in the master's work, and when he began to paint independently he was seen to have acquired Perugino's manner. In 1504, after a period of study and work at Siena, he visited his native town, and while there he painted *Christ Praying on the Mount of Olives*, a *Saint Michael* and a *Saint George*, the two last of which are now in the Louvre. Toward the end of the same year he proceeded to Florence, attracted thither by the fame of its numerous artists, and in this center of the highest artistic life of the time he studied diligently for a period of four years, with short intervals of return to his native city.

Rappahannock

In Florence he rapidly gained a wider knowledge of his art and soon began to forsake the manner which he had adopted from Perugino. The sources from which he sought and obtained the artistic knowledge which enabled him to develop his new style were various. From Michelangelo he learned simplicity and strength of outline, from Leonardo da Vinci he acquired grace of expression and composition, while from Fra Bartolommeo he gained a subtler depth of coloring and from Masaccio a broader treatment of drapery and dramatic effects. During the last two years of his stay in this city he painted, in what is known as his Florentine manner, many of what are now considered his most important works. Of such may be mentioned the *Entombment of Christ*, *Madonna del Gran Duca*, *Holy Family*, *Christ Bearing the Cross* and *Marriage of Joseph and the Virgin*.

In 1508 he went to Rome, at the invitation of Pope Julius II, and began his work on the frescoes of the four chambers of the Vatican which are now known as the Stanze of Raphael. Here he executed the *Disputa*, or "Dispute of the Fathers of the Church," in which painting is recognizable the transition to his third manner, which is still more clearly manifested in the *School of Athens*. After the accession of the new pope, Leo X, Raphael became the chief architect of Saint Peter's, where he further distinguished himself. During this time he prepared designs for several palaces in Rome and other cities of Italy and finished the *Sistine Madonna*, probably the most famous of his works, for the Church of Saint Sixtus, in Piacenza. To this period also belong his easel-pieces of *John in the Desert*, his *Madonna and Child*, on whom an angel is strewing flowers, the *Madonna della Seggiola*, or *Madonna of the Chair*, and *Saint Cecilia* (See MADONNA). Raphael's last and unfinished painting, the *Transfiguration of Christ*, is in the Vatican. His pictures have never been excelled in the arrangement of figures and in the expression of human affection. He avoided all harshness, and united grace and elegance with the spirit of religion. Raphael died at the age of thirty-seven and was buried in the Pantheon with highest honors.

Rapier, *ra'pe ur*, a light, highly tempered, edgeless, finely pointed, sword-like weapon, used for thrusting. It is about three feet in length, and was long a favorite weapon for duels. Its use now, however, is restricted to occasions of state ceremonial.

Rappahan'nock, a river in Virginia, which rises in the Blue Ridge, runs e. s. e. about 155 mi.

and flows into Chesapeake Bay. It passes the towns of Falmouth, Fredericksburg, Port Royal and Leeds and is navigable to Fredericksburg, about 100 miles.

Rar'itan, a river of New Jersey, formed by two branches, which unite and flow southeast into Raritan Bay, near Perth Amboy. It is 75 miles long and is navigable as far as New Brunswick.

Raspberry, *raz'ber ry*, the fruit of a well-known, shrubby plant, which is of the same genus as the blackberry. Several species are found growing wild in America and in northern Europe and Asia. In the United States the common *red raspberry* is very abundant, especially in the Northern states. It is a delicious fruit, but is not easily marketed, because it is so liable to be crushed and spoiled. The raspberry crop in the United States is second only to the strawberry, about 80,000,000 quarts being the annual output. Strictly speaking, the raspberry is a collection of small stone fruits, like little cherries, grouped together around a receptacle, from which they part easily when the fruit is ripe.

Rat, a common rodent mammal that is a pest to mankind almost everywhere. The best-known species are the *Norway*, or *brown*, *rat* and the *black rat*. The brown rat, which is the larger and stronger, grows to about nine inches in length and is of a brownish color above and white below. Supposed to have belonged originally to India and China, it became known in Europe about the middle of the eighteenth century; but it is now found in almost every part of the habitable globe. This is a voracious animal, swims readily in water and breeds four or five times in the year, each brood numbering about a dozen. The black rat is usually about seven inches in length, has a sharper head, larger ears and a much longer tail than the brown rat. It is also much less numerous and more timid.

Ratch'et, a piece of metal hung on a pivot at one end, the other being shaped so as to fit into the teeth of a wheel. The ratchet is used to prevent a backward motion of a wheel, as in the windlass and derrick, and also to turn a wheel by degrees, as in moving the carriage of a typewriter. A wheel with which a ratchet is used is called a ratchet wheel.

Ra'tel, a carnivorous animal of the badger family, found chiefly in South and East Africa and in India. The *Cape*, or *South African*, *ratel* averages about three feet in length, including the tail. The fur is thick and coarse, the color is black on the under parts, muzzle and limbs

while the tail, upper surface, sides and neck are of a grayish hue. Ratels are very fond of honey



RATEL

and destroy many nests of the wild bees, for which reason they are often called *honey badgers*.

Ratio, *ra'she o* or *ra'sho*, the numerical relation which two quantities of the same kind bear to each other. It is expressed as the quotient obtained by dividing one quantity by the other. See PROPORTION.

Rationalism, *rash'un al iz'm*, that doctrine which claims the right of reason to decide on all matters of faith and morals, whatever so-called "authority" may have to say on the matter. Rationalism has had perhaps its chief center and widest success in Germany; but its chief source may be found in the English deism of the seventeenth and eighteenth centuries. The first step taken by the English deists was an attempt to take from the doctrines of Christianity whatever is above the comprehension of the human reason; their next step was to discard from Christianity such facts as could not be verified by any man's experience. This led to an attempt to get rid of Christianity altogether. German rationalism was also influenced by the writings of Voltaire and by the skeptical freedom of thought which existed among the French *savants* at the court of Frederick the Great.

Rat'isbon, or **Regensburg**, a town of Bavaria, capital of the Upper Palatinate, on the right bank of the Danube, opposite the mouth of the Regen, 65 mi. n. n. e. of Munich. Its narrow, crooked streets and turreted, medieval-looking buildings make it one of the quaintest of German towns. The most remarkable public buildings are the cathedral, the Rathaus, the Romanesque Church of Saint Emmeram, the royal villa and the mint. The manufactures include lead and colored pencils, porcelain and stoneware hosiery, woolen cloth, leather, machinery, hardware, gloves, sugar and tobacco. There are also breweries and other works. Rat-isbon existed under the Celtic name of *Radas-bona* in pre-Roman times, and it was a Roman frontier fortress under the name of *Castra Regina*. Subsequently it became the residence of the old

Rat Kangaroo

dukes of Bavaria, rose to the rank of an imperial city and continued long to be the seat of the imperial diets. The sieges which it has withstood number no fewer than seventeen. Population in 1910, 52,624.

Rat Kangaroo. See KANGAROO RAT.

Raton, *ra tone'*, N. M., the county-seat of Colfax co., about 130 mi. n. e. of Santa Fé and 8 mi. s. of the north boundary of the territory, on the Atchison, Topeka & Santa Fé railroad. It is the business center of a large farming and stock-raising region. There are also extensive coal fields in the vicinity. The railroad has a division terminal here, and the city contains railroad shops, stockyards, grain elevators, brick works and lumber yards. It has a national bank and three weekly newspapers. Population in 1910, 4539.

Rattan', the long, slender stems of several species of tropical plants, that grow principally in India and the islands of the Pacific. Rattan



RATTAN

is exported in large quantities and is used in Europe and the United States in the making of chairs, canes and other things which require light, flexible wood. The Chinese make sails, mats and cables from rattan. The fruit and the young shoots of some species are used as food.

Rattlesnake, a name of various poisonous American snakes, distinguished from the other members of the family by a series of horny rings

Raven

on the end of the tail, which the animal vibrates in such a manner as to make a rattling sound. The rattlesnake is one of the most deadly of poisonous serpents, but hogs and peccaries kill and eat it, finding protection in the thickness of their hides and the depth of their layers of fat. A number of species belong to the United States and Mexico. East of the Mississippi the *banded rattlesnake* is the best-known and most dreaded species. It is naturally a sluggish animal, ready to defend itself, but seldom commencing the attack. It feeds on rats, squirrels and small rabbits and reaches a length of five or six feet. The *striped rattlesnake* is found from Mexico to Brazil; the *diamond rattlesnake*, sometimes eight feet long, greenish or golden-brown, marked on the back with diamond-shaped spots, is found in the swamps of the Southern states. The *Western black rattlesnake*, the *prairie rattlesnake*, the *horned rattlesnake* and various other species are scattered throughout the country. The venom in a rattlesnake's bite seems to vary with the season and with the individual. See SNAKE.

Rauch, *rowK*, CHRISTIAN (1777-1857), one of the most distinguished of German sculptors, born at Arolsen. He received some instructions from the sculptor Ruhl, at Cassel, and afterward proceeded to Berlin to enter the personal service of King Frederick William III, of Prussia. His first two productions of note were *Sleeping Endymion* and *Artemis* and a bust of Queen Louise. In 1804 he went to Rome, where he made the acquaintance of Thorwaldsen and Canova and obtained the patronage of Wilhelm von Humboldt. He received an invitation in 1811, from the king of Prussia, to design a monument to Queen Louise, and he produced a noble work, which established his fame. From this time onward he was the sculptor of an immense number of works in all the branches of the statuary art. He was especially great in ideal figures and in portraiture.

Raven, a large bird of the crow family, whose plumage is entirely black. Like the crows, it can be taught to imitate human speech, and in a domesticated state it is remarkable for its destructiveness, thievishness and love of glittering things. It is a carrion-feeding bird, which can detect the presence of its food at a distance of several miles. Ravens are found in every part of the world, usually living in pairs, building rough nests on high cliffs, in which they lay their four or five greenish eggs, speckled with brown and black. Many superstitions are connected with the ravens, and they are frequently

Ravenna

referred to in literature as symbolical of bad luck and as foreboding death. Edgar Allan Poe's



RAVEN

poem *The Raven* is based upon this superstition. Ravens are long-lived birds, some of them reaching the age of seventy or eighty years.

Raven'na, a town of Italy, capital of the province of the same name, about 6 mi. from the Adriatic and 43 mi. e. by s. of Bologna. The principal edifices are the cathedral, founded in the fourth century, but rebuilt during the eighteenth; the baptistry, and the numerous basilicas. The manufactures are of little importance, although glass and musical instruments are made and silk is spun and woven. The harbor of Ravenna was in early times large enough to contain the fleets of Augustus, but it gradually silted up, and the city is now connected with the Adriatic by a canal. Ravenna is an ancient place, and during the decline of Rome, in 404 A. D., Honorius made it the capital of the Western Empire. Thereafter it fell into the hands of Odoacer, who in his turn was expelled by Theodoric, under whom it became the capital of the Goths. It was recaptured by Belisarius, who made the town and its territory an exarchate. This exarchate was terminated by the king of the Lombards, who made Ravenna the metropolis of the Longobardic kingdom in 752. Pippin and Charlemagne, having succeeded in expelling the Lombards, made a present of Ravenna and its exarchate to the pope, with whom it remained till 1860. Population in 1911, including suburbs, 71,581.

Raw'lins, Wyo., the county-seat of Carbon co., 136 mi. w. by n. of Laramie, on the Union Pacific railroad. It is the business center for a large sheep-raising and mining region. There are electric lights and three hotels. It is the seat of the state penitentiary, and the railroad has repair shops here. Population in 1910, 4256.

Ray

Rawlins, JOHN AARON (1831-1869), an American soldier and administrator, born at East Galena, Ill. He studied law and was admitted to the bar in 1854. On the outbreak of the war, he became an ardent Unionist, was placed in command of an Illinois regiment and later was adjutant general on Grant's staff. From time to time he was promoted until he became brevet major general. President Grant appointed Rawlins secretary of war, but Rawlins died a few months later.

Rawlinson George, (1812-1902), English clergyman and historian, brother of Sir Henry Rawlinson. He graduated at Trinity College, Oxford, in 1838, and two years later was elected a fellow of Exeter College. He continued his connection with Oxford until 1889, for nearly thirty years of that time holding the Camden professorship of ancient history. He was ordained in the Church of England in 1841, but his professorial duties occupied most of his time until 1872, when he was appointed canon of Canterbury cathedral. From 1888 until his death he was rector of All Hallows' Church, London. Rawlinson is best known as a historian by his translation of *Herodotus*, by the *Five Great Monarchies of the Ancient World* and by a *History of Ancient Egypt*.

Raw'linson, HENRY CRESWICKE, Sir (1810-1895) an English soldier and diplomat, born at Chadlington, Oxfordshire. In 1827 he entered the military branch of the East India Company's service, and the following year he became interpreter of Hindustani and Persian and was rapidly promoted to important posts in the service in India, Persia and Arabia. At the same time he had opportunity to study the cuneiform inscriptions which he found at the various posts, and his reports, which were printed by the Royal Geographical Society of England, brought him great fame. On returning to England he received high honors, both in politics and from learned societies, and he was knighted in 1891.

Ray, a family of fishes, including the skate, saw-fishes and sea-devils, recognized by the flattened body and by the extremely broad and fleshy fins, which seem to be mere continuations of the body at the side. The most common members of this group are the *skate*, or *thornback ray*, so named from the curved spines which arm the back and tail, and the *common gray*, or *blue skate*, which possesses a sharply pointed muzzle and a somewhat lozenge-shaped body. The *starry ray* is so called from having a number of spines on its upper surface, rising from rays, or

starlike, bases; it reaches a length of thirty inches. The *sting ray* lives in the Mediterranean Sea, but it is also found on the British coasts. Its tail is armed with a long spine, which serves as a means of defense. This ray sometimes attains a length of ten feet. Members of the ray family are found in all seas, and more than one hundred species are known. See SKATE.

Raymond, HENRY JARVIS (1820-1869), an American journalist and politician, born at Lima, N. Y. He graduated at the University of Vermont and studied law in New York, but he contributed to Greeley's literary weekly, *The New Yorker*, and upon the founding of the *Tribune*, in 1841, became its assistant editor. After working for the *Courier and Enquirer*, he founded the *Times* in 1851. He was known as a prominent Whig in the state assembly, became lieutenant governor and was an important delegate to the first national convention of the Republican party, for which he wrote the memorable "Address to the People." He supported Seward and later followed Lincoln, but after the first Battle of Bull Run, he proposed a provisional government, in the belief that Lincoln was too hesitating. Raymond was speaker of the New York assembly, was an unsuccessful candidate for the United States Senate and supported President Johnson in Congress. He declined the mission to Austria, and in 1866 he left the Republican party, to help organize the National Union (Loyalists') Convention, for which he wrote the "Philadelphia Address." He wrote several historical and biographical works and did much to raise the tone of journalism.

Razor, a tool used for shaving off the beard or hair. Razors are made of the best quality of steel and usually have thin blades, with concave sides. The back is thick, and the blade is fastened to the handle by a rivet, upon which it turns. When closed, the handle protects the edge of the blade. The safety razor has a guard which prevents cutting the face. The best razors are made in Sheffield, England.

Re or **Ra**, *ray*, the name of the god of the sun among the ancient Egyptians. He is represented like Horus, with the head of a hawk, and with the disk of the sun on his head.

Read, *reed*, OPIE PERCIVAL (1852-), an American author, born in Nashville, Tenn. He was engaged in newspaper work in Little Rock, Louisville, Nashville and Cleveland and was the founder of the *Arkansas Traveller*. Among his novels are *Len Gansett*, *A Kentucky Colonel*, *A*

Tennessee Judge, *The Wives of the Prophet* and *The Jucklins*.

Read, THOMAS BUCHANAN (1822-1872), an American painter and poet, born in Chester co., Pa. His early life was unsettled and wandering. He did his first work in Boston. His paintings are full of poetic fancies, but the technical treatment is somewhat careless. His poems are marked by a fervent spirit of patriotism and artistic power in the description of American scenery and rural life. He is best known as a poet, especially for *Sheridan's Ride* and *Drifting*. He also wrote *The House by the Sea* and *Female Poets of America*.

Reade, CHARLES (1814-1884), an English novelist and playwright. He was educated at Magdalen College, Oxford, and held offices of honor in the university. His first novel, *Peg Woffington*, was expanded from the play *Masks and Faces*, written in conjunction with Tom Taylor. This was followed by *Christie Johnstone* and *Never Too Late to Mend*, one of his "novels with a purpose," in which he attacked the English prison system. *Hard Cash* deals with the abuses practiced in insane asylums, and *Put Yourself in His Place* is an attack on the excesses of trade unionism. The most artistic of his writings, *The Cloister and the Hearth*, dealing with the lives of the parents of Erasmus, appeared in 1861. Reade is not one of the great English novelists, but his plots, while often sensational, are always interesting.

Reading, *read'ing*. A person reads either for his own entertainment or instruction or for the benefit of others. Accordingly, every teacher is concerned with both silent and oral reading for her pupils. In the article READING, METHODS OF TEACHING, the pedagogical side of the question is fully discussed. In the article LITERATURE, a general view of that subject in the different countries of the world is given. It remains for this article to suggest certain courses of reading which will prove profitable to children and adults.

READING FOR ADULTS. I. Topical List. The majority of people read for information and rarely give very much attention to the style in which thought is expressed. The reader of novels is content with the story and may follow the plot through with absorbing interest and fail to get the varied delights which a knowledge of the literary merits of the selection would bring. If, however, a person will read persistently the works of the best authors, beginning, perhaps, with stories and those works of fiction which are

generally considered the most entertaining, always watching for beauties of expression and examples of power in any direction, he will gradually acquire the art of getting far more pleasure from his reading than he thought possible at first. It is not wise to follow an elaborate and systematic course of reading, which some one else recommends, unless enjoyment and interest accompany it. It is far better to confine one's self to those things which appeal directly to sympathy, affection, love and other emotions, than to feel that time spent in reading is wasted if it does not bring instruction. However, there are certain things which almost every one will enjoy, if he will give sufficient attention to them. These are the really great works in literature. A person desirous of acquiring a taste for good literature and of possessing a real acquaintance with the literature of inspiration might take up with profit a course of reading like the following and pursue it, in general, in the order in which the books are mentioned, omitting such as have previously been read. If taste and experience warrant, the reader may profitably begin anywhere in the list and read in accordance with his own inclination.

Fiction. *The Last of the Mohicans*, *The Spy* and *The Pilot*, by James Fenimore Cooper; *Uncle Tom's Cabin*, Harriet Beecher Stowe; *The Scarlet Letter* and *The House of the Seven Gables*, Nathaniel Hawthorne; *Lorna Doone*, R. D. Blackmore; *Last Days of Pompeii*, Bulwer-Lytton; *A Daughter of Heth*, William Black; *The Rise of Silas Lapham*, W. D. Howells; *Hypatia*, Charles Kingsley; *Ivanhoe* and *The Heart of Midlothian*, Sir Walter Scott; *Romola*, George Eliot; *Oliver Twist* and *David Copperfield*, Charles Dickens; *The Vicar of Wakefield*, Oliver Goldsmith; *Henry Esmond* and *Vanity Fair*, William M. Thackeray.

Narrative Poems. *Evangeline* and *The Courtship of Miles Standish*, by Henry W. Longfellow; *Lars*, Bayard Taylor; *Enoch Arden*, Alfred Tennyson; *Snowbound*, John G. Whittier; *Marmion* and *Lady of the Lake*, Sir Walter Scott; *The Knight's Tale*, Geoffrey Chaucer; *Paradise Lost*, John Milton.

Essays. *Dream Children* and *Dissertation upon Roast Pig*, by Charles Lamb; *Sir Roger de Coverley Papers* from *The Spectator*, Joseph Addison; *My Study Fire*, Hamilton W. Mabie; *Birds and Bees* and *Wake Robin*, John Burroughs; *Dream Days*, Kenneth Grahame; *Essays in Idleness*, Agnes Repplier; *My Study Windows*, James Russell Lowell; *Virginius Puerisque*, Robert

Louis Stevenson; *The Autocrat of the Breakfast Table*, Oliver Wendell Holmes; *Crown of Wild Olives*, John Ruskin; *Self Reliance*, *Compensation* and *The American Scholar*, Ralph Waldo Emerson; *John Milton*, Joseph Addison and Warren Hastings, Thomas Babington Macaulay; *Of Nature in Men* and *Of Studies*, Sir Francis Bacon.

Lyric Poetry. (1) Miscellaneous Lyrics: *The Rainy Day*, by Henry W. Longfellow; *To a Waterfowl* and *The Wind and the Stream*, William Cullen Bryant; *To a Daisy* and *The Daffodils*, William Wordsworth; *To a Mouse*, *For a' That and a' That* and *Auld Lang Syne*, Robert Burns; *The Chambered Nautilus*, Oliver Wendell Holmes; *The Destruction of Sennacherib*, George Gordon Byron; *An Old Played-out Song*, James Whitcomb Riley; *Ode to a Skylark*, Percy Bysshe Shelley; *To a Dandelion*, James Russell Lowell; *Annabel Lee*, Edgar Allan Poe; *L'Allegro* and *Il Penseroso*, John Milton. (2) Elegies: *Elegy in a Country Churchyard*, Thomas Gray; *Threnodia*, James Russell Lowell; *In Memoriam*, Alfred Tennyson; *Lycidas*, John Milton; *Adonais*, Percy Bysshe Shelley. (3) Sonnets: *Victor and Vanquished* and *The Two Rivers*, Henry W. Longfellow; *On His Own Blindness*, John Milton; *Night*, Alfred Tennyson; *Reading*, James Russell Lowell; *When She Comes Home*, James Whitcomb Riley; *Composed on Westminster Bridge*, William Wordsworth.

Dramas. *She Stoops to Conquer*, by Oliver Goldsmith; *The Rivals*, Richard Brinsley Sheridan; *Richelieu*, Bulwer-Lytton; *Macbeth*, *Hamlet*, *Romeo and Juliet*, *The Tempest*, *Much Ado about Nothing*, *Comedy of Errors*, *Julius Caesar*, *Richard III* and *King Lear*, William Shakespeare.

Such a list cannot be considered as complete, but it is really suggestive. No one can read the works mentioned here without having brought to his attention a number of other masterpieces in each group. If, in reading, a person becomes interested in the works of any writer, his reading should not be limited to the titles suggested here, but should be pursued as long as it seems pleasing and profitable and as time permits. In so reading, other writers will come into view, whose works deserve and should receive attention. The course of reading suggested, then, might be considered as a series of starting points for more extended reading.

Other departments of literature furnish different styles of reading which many will follow with interest and profit. Among the famous orations, for instance, are *The Scholar in a Republic* and

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The Lost Arts, by Wendell Phillips; *Reply to Hayne*, Daniel Webster; *On Conciliation with America*, Edmund Burke. Many of the great histories and biographies are real literature and may be read with the same genuine pleasure that fiction gives. Among the biographies should be included Franklin's *Autobiography*; *Life of Charlotte Brontë*, by Gaskell; *The Early History of Charles James Fox*, by Trevelyan; *La Salle*, by Parkman. *The Rise of the Dutch Republic*, by Motley, and *The Conquest of Mexico*, by Prescott, are types of the finest literary history.

II. If a person desires to undertake a rather wide range of reading, in chronological order, he may get a comprehensive knowledge of English and American literature in its different epochs by reading the following books, in the order given:

English. *The Prologue of the Canterbury Tales* and *The Knight's Tale*, Geoffrey Chaucer; the ballads of *Chevy Chase* and of *Robin Hood*; *Of Nature in Men, Of Expense, Of Studies* and other essays, Sir Francis Bacon; the first and third cantos of *The Faerie Queene*, Edmund Spenser; *Hamlet, Julius Caesar, Twelfth Night, The Tempest* and *Richard III*, William Shakespeare; *L'Allegro, Il Penseroso* and *Paradise Lost*, John Milton; *Robinson Crusoe*, Daniel Defoe; *Gulliver's Travels*, Dean Swift; *The Spectator*, Joseph Addison; *Essay on Man*, Alexander Pope; *On Conciliation with America*, Edmund Burke; *Clarissa Harlowe*, Samuel Richardson; *Tom Jones*, Henry Fielding; *Roderick Random*, Tobias Smollett; *Tristram Shandy*, Laurence Sterne; *She Stoops to Conquer, The Deserted Village* and *Vicar of Wakefield*, Oliver Goldsmith; *The Ancient Mariner*, Samuel Taylor Coleridge; *Tales from Shakespeare* and *Essays*, Charles Lamb; *The Lay of the Last Minstrel, Lady of the Lake, Ivanhoe, Heart of Midlothian, The Talisman* and *Old Mortality*, Sir Walter Scott; *The Dream, The Prisoner of Chillon, Destruction of Sennacherib* and *Childe Harold*, George Gordon Byron; *Ode to the Skylark, The Cloud and Adonais*, Percy Bysshe Shelley; *Ode on a Grecian Urn* and *Ode to Autumn*, John Keats; *To a Daisy, The Solitary Reaper, The Daffodils, She Was a Phantom of Delight* and *Bereavement*, William Wordsworth; *Auld Lang Syne, Flow Gently Sweet Afton, Highland Mary, To Mary in Heaven* and *The Cotter's Saturday Night*, Robert Burns; *How Horatius Kept the Bridge, John Milton* and *Joseph Addison*, Thomas Babington Macaulay; *Heroes and Hero Worship*, Thomas Carlyle; *Sohrab and Rustum* and *Essays in Criti-*

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cism, Matthew Arnold; *Pendennis, Henry Esmond* and *Vanity Fair*, William M. Thackeray; *Adam Bede, Romola* and *Silas Marner*, George Eliot; *Last Days of Pompeii*, Bulwer-Lytton; *In Memoriam*, Alfred Tennyson; *Pippa Passes*, Robert Browning.

American. A chronological view of American literature should include the reading of such works as the following:

The Last of the Mohicans, The Pilot and *The Spy*, James Fenimore Cooper; *Thanatopsis* and *To a Waterfowl*, William Cullen Bryant; *The Sketch Book, Knickerbocker History of New York* and *The Alhambra*, Washington Irving; *The Raven, Annabel Lee, The Gold Bug* and *The Murders in the Rue Morgue*, Edgar Allan Poe; *The Scarlet Letter* and *The House of the Seven Gables*, Nathaniel Hawthorne; *Self Reliance, Compensation* and *The American Scholar*, Ralph Waldo Emerson; *Wild Apples, Walden* and *A Week on the Concord and Merrimack Rivers*, Henry D. Thoreau; *Uncle Tom's Cabin* and *Old Town Folks*, Harriet Beecher Stowe; *Snowbound*, John G. Whittier; *The Psalm of Life, The Reaper and the Flowers, Resignation, The Courtship of Miles Standish, Evangeline* and *Hiawatha*, Henry W. Longfellow; *The Chambered Nautilus, Old Ironsides, The Deacon's Masterpiece, The Guardian Angel* and *The Autocrat of the Breakfast Table*, Oliver Wendell Holmes; *She Came and Went, The First Snowfall, Two Angels, The Vision of Sir Launfal, Biglow Papers* and *My Study Windows*, James Russell Lowell. No mention is made of recent writers or of current literature. The magazines and public press will keep one informed as to these.

READING FOR CHILDREN. In city schools the course of study is well established and the reading matter for every grade is carefully selected, so that teachers cannot well go astray. In the smaller graded schools and, in fact, in the district schools, the character and quantity of reading in each grade or class can easily be determined from courses of study or by following any one of the many excellent sets of modern readers. In most schools, too, more or less reading matter supplementary to the general course is available, and usually teachers have only to ask for more, in order to obtain it. The following list of supplementary works is intentionally brief, but yet it shows a course of reading which might be followed with profit in almost any school where no specific plans have been made for supplementary work. If the teacher finds that a book is not adapted to being read aloud or is too simple or

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too difficult for the pupils for whom it was assigned, then she has only to go above or below in the list till she finds a book which is adapted to the individual. A child will enjoy listening to books which he cannot read to his own satisfaction until a year or more later. Moreover, children will listen time and again to the stories they like best and seemingly get more and more enjoyment out of them at each reading; so, it is not always necessary to have a great number of books for any grade, if the few that are on hand suit the tastes of the readers. The following list should be helpful to parents, also, in selecting the reading for their children, whose rank in school they know or may easily learn. None of the books mentioned are expensive, and most of them may be obtained in cheap form from the school-book publishing houses.

Primary Schools. *A Hiawatha Primer*, Holbrook; *Classic Stories for Little Ones*, McMurry; *Stories of the Red Children*, Brooks; *Jingle Book*, Wells; *When Life is Young*, Dodge; *Fables and Folk Stories*, Scudder; *Counterpane-Fairy*, Pyle; *The Birds' Christmas Carol*, Wiggin; *Hans Andersen's Stories*; *Little Lame Prince*, Craik; *King of the Golden River*, Ruskin; *Wonder Book*, Hawthorne; *Fifty Famous Stories Retold*, Baldwin; *Stories of Indian Children*, Husted; *Ten Boys Who Lived on the Road from Long Ago to Now and Seven Little Sisters*, Andrews.

Intermediate Schools. *Alice's Adventures in Wonderland*, Carroll; *Tanglewood Tales*, Hawthorne; *Hiawatha*, Longfellow; *Black Beauty*, Sewell; *Captain January*, Richards; *Child Life in Poetry*, Whittier; *Chuck Purdy*, Stoddard; *Five Little Peppers and How They Grew*, Sidney; *Hans Brinker*, Dodge; *Courtship of Miles Standish*, Longfellow; *A Christmas Carol*, Dickens; *Enoch Arden*, Tennyson; *Birds and Bees*, Burroughs; *Jungle Book*, Kipling; *Story of a Bad Boy*, Aldrich; *Toby Tyler*, Otis; *Widow O'Callahan's Boys*, Zollinger; *Boys of '76*, Coffin; *Story of the Greeks*, Guerber; *First Book of Birds*, Miller; *Little Brothers of the Air*, Miller; *Lobo, Rag and Vixen*, Thompson.

Grammar Schools. *Rip Van Winkle*, Irving; *Snowbound*, Whittier; *Grandmother's Story of Bunker Hill*, Holmes; *The Deerslayer*, *The Pilot* and *The Last of the Mohicans*, Cooper; *Tom Brown's School Days*, Hughes; *Timothy's Quest*, Wiggin; *Little Book of Profitable Tales*, Eugene Field; *Vision of Sir Launfal*, Lowell; *Merchant of Venice*, *Julius Caesar* and *Macbeth*, Shakespeare; *Lady of the Lake* and *Ivanhoe*, Scott; *Hugh Wynne*, Mitchell; *Man Without a Country*, Hale;

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Men of Iron, Pyle; *Prince and Pauper*, Twain; *Stories from Homer*, Church; *Story of Siegfried*, Baldwin; *Franklin's Autobiography*; *George Washington*, Scudder; *Child Life in Colonial Days*, Earle; *War of Independence*, Fiske; *Boy Travelers in Southern Europe*, Knox; *American Citizen*, Dole; *Among the Law Makers*, Alton; *Biography of a Grizzly*, Thompson; *In Nesting Time*, Miller; *Pepacton*, Burroughs; *Wild Neighbors*, Ingersoll; *A-Hunting of the Deer and Other Essays*, Warner; *Life on the Farm*, Shepard.

High Schools. By the time pupils have reached the high school, they should be able to arrange their own courses of reading, or, if they need further suggestions in that line, either of the courses outlined for adults in the earlier part of this article will be found helpful. Reading is too valuable an art to be spoiled by careless indulgence in a pleasing habit. The young student especially should guard himself against the enticements of fiction. While, as has been indicated in the early part of this article, fiction serves an excellent purpose in the beginning of a course of reading and as means of entertainment throughout one's life, yet over-indulgence in that line dissipates the attention and prevents the growth of interest in profoundly greater fields of literature. It is wise to establish the rule that from a third to a half of a person's reading should be of a higher and more instructive type than can be found in stories and novels. The old books, the books that have been well established in their position for many years, are the ones that deserve the reader's first attention, for they have demonstrated their value. Nothing is lost in rereading a good book. Any work that deservedly ranks high gives more pleasure and confers more lasting benefit during the second reading than the first.

Reading, MASS., a town in Middlesex co., situated on the Boston & Maine railroad, 12 mi. n. w. of Boston. It is noted for its manufactures of boots and shoes, rubber goods, organ pipes and wire brushes, but it is chiefly a residence city. Population in 1910, 5818.

Reading, red'ing, PA., the county-seat of Berks co., 58 mi. n. w. of Philadelphia and 55 mi. e. of Harrisburg, on the Schuylkill River, on the Schuylkill Canal, and on the Pennsylvania and the Philadelphia & Reading railroads. It is connected with Philadelphia and with surrounding cities and towns by electric railways. The city has a beautiful situation on a bluff which rises gently from the river to Mount Penn, on the east. The Neversink Mountains, just south of the city, have a height of about 1000 feet. Several hotels

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and popular resorts, with magnificent views, are located on these mountains and are connected with the city by electric railways. The city is well built and well paved.

There are excellent public schools, with separate high schools for girls and boys, and the building for the latter cost \$400,000. There are also excellent private schools and business colleges. The Keystone State Normal School is at Kutztown, not far away. The city is well supplied with hospitals and other charitable institutions. Some of the other prominent buildings are the city hall, the courthouse, the postoffice, the Academy of Music, the Masonic Temple, the Colonial Trust building, the Baer building and several hotels and business blocks.

The city is near the anthracite coal fields, in a region of large mineral wealth, and is in a very fertile agricultural country. There is a great variety of manufactures, about one-fourth of which consist of iron and steel products. Many of the steel projectiles used by the United States navy and the letter boxes seen on the streets throughout the country are made here. Here are the principal shops of the Philadelphia & Reading Railroad, many foundries, machine shops, breweries, cigar factories, knitting and hosiery mills, paper and wood pulp works, hat factories and carriage works. There are, in all, more than one thousand manufacturing establishments in the city. There are fourteen banking institutions, with a capital and surplus of \$7,000,000 and deposits of \$12,000,000. The place was first settled by Germans, but many English colonists came later and named it after Reading, England. It is the chief center of the Pennsylvania German population. It was laid out in 1748, was incorporated as a borough in 1783 and was chartered as a city in 1847. Population in 1900, 78,961; in 1910 it was 96,071.

Reading, METHODS OF TEACHING. Reading is a thought-getting and thought-giving process. The first is silent reading; the second, oral reading. The purpose of teaching a child to read is to enable him, first, to get the thought from the printed page, and second, to give that thought to others. Thought-getting, or learning to read, characterizes the greater part of the instruction in reading during the first three years the child is in school. The process includes the following steps, each of which should receive careful attention: (1) Learning the meaning of words; (2) learning the forms of words; (3) learning the sound of words, or their pronunciation; (4)

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understanding the thought in the sentence; (5) understanding the selection read.

PRIMARY GRADES. The reading in the primary grades includes that of the first three years in the well-graded school. During this time the child should not only learn to recognize words and sentences, but he should become reasonably proficient in reading from books within his capacity. In order that this end may be reached, the teacher should give careful attention to two phases of the work:

Methods. There are three methods of teaching primary reading in general use. They are known as the sentence method, the word method and the phonic method. The sentence method begins with the sentence, which the pupils are taught to read at sight, then proceeds to the study of the separate words in the sentence, so that they may be recognized alone. Since the sentence is the unit of thought and of expression, and since the child grasps things as wholes, this is by far the most desirable method to use at the beginning. It is much easier to teach a child to read a sentence, as, "I have a cat; John has a book," than it is to teach him to recognize the same number of words when they have no relation to each other. Hence the skilful teacher in reading selects, for her first lessons, certain objects in which the children will take a lively interest, and after obtaining from them, through questioning, desired sentences, she writes these upon the board in a plain hand, then has the pupils read them.

The next step is to lead the pupils to recognize the different words and phrases as they occur, by asking different questions and leading the pupils to make other statements about the object. This is usually accomplished by having the pupils read sentences containing the same words in different order. After drills of this sort the pupils quite readily recognize the different words in the sentence when written upon the board. From this it will be seen that the sentence method and the word method are inseparable. In fact, the so-called word method is only a phase of teaching reading by the sentence method.

The phonic method consists in the analysis of words, for the purpose of discovering the sounds of the letters which the words contain. It should not be introduced until the pupils have been reading for some months. In the second reader grade, it can be applied successfully if too much is not attempted, and in the third reader grade a good deal of attention should be given it, because when once learned, this method places the

pupil in possession of the ability to discover and pronounce a great many new words for himself. From this it will be seen that the successful method in reading consists in the blending of the three methods here described, and no teacher can obtain the best results without using them all, and substantially in the order named.

The Recitation. The teacher should make careful preparation for each recitation. In doing this, she should observe the following points: (1) Plan to present the lesson in an interesting manner; (2) plan to have the class learn one or more new words; (3) review the words previously learned, by combining them in new sentences; (4) select for the lessons such sentences as will prepare the pupils for the reader. Before the book is placed in their hands, they should learn all of the words and many of the sentences found on the first eight or ten pages. In rural schools it is necessary that the books be placed in the hands of the pupils at the earliest possible date; hence, the teacher should give the first reader careful study, before beginning the work in reading with her entering class.

In the recitation, the reading and the word study must be carried along together, but if much time is needed for word study, greater progress is made by devoting one period to reading and another to drill on words. The teacher should lead her pupils to read in natural tones and with correct expression. In case they have difficulty with pronunciation, drill exercises on the difficult words should be given.

INTERMEDIATE AND GRAMMAR GRADES. The work in reading in these grades is for the purpose of leading the child to love good literature, to acquire an ability in silent reading and fluency in oral expression. In order that these ends may be secured, the intellectual element in reading should receive careful attention in these grades. Children cannot take interest in what they do not understand; hence, when a difficult selection is presented, it is wise for the teacher to discuss the selection with the class before the lesson is studied. In doing this, she should explain all the difficult passages. At the time of the recitation the pupil's understanding of these passages should be tested before the lesson is read; otherwise, he will stumble in the reading.

At this period the pupils should be introduced to the use of reference works, if such works are at their disposal. In case they are not, the teacher should give the information which the pupils cannot obtain for themselves. It is all-important that the class get the proper setting for the les-

son. This setting should include the imaging of the scene and an understanding of the most important mythological, historical, geographical and other allusions which the selection may contain. The emotion necessary to proper expression will naturally follow the comprehension of the subject-matter.

In order that the teacher may successfully conduct exercises in reading in these grades, it is often necessary that she study broadly, as the selections frequently contain allusions to the various branches of natural science, mythology, history, art and the greater works of literature.

Much valuable assistance in teaching reading may be obtained from the prefaces found in all of the better series of readers. These should be carefully studied by every teacher. The teacher of primary reading should also make a thorough study of the readers which the pupils are to use. This study should be from the teacher's point of view and should enable her to obtain a thorough understanding of the plan of each book, of its gradation and of the steps necessary to lead the pupils from the first to the second reader, and from the second to the third reader. Many series of readers are defective in this respect and need more or less supplemental work. Consult Arnold's *Reading: How to Teach It*. Teachers of advanced reading will find valuable aid in Clark's *How to Teach Reading in the Public Schools*. See METHODS OF TEACHING.

Reagan, re'gan, JOHN HENNINGER (1818-1905), an American statesman, born in Sevier County, Tenn. He received an elementary education and in 1839 went to the newly-organized Republic of Texas, where he began a little later the practice of law. After the admission of Texas to the Union, he was made a Federal judge and from 1857 to 1861 he was a member of Congress. At the secession of his state in 1861 he resigned, entered the provisional congress of the Confederacy and in March, 1861, became postmaster-general of the Confederate states. He also served for a time in 1865 as secretary of the treasury. He was captured with President Davis in May, 1865. He was again elected to Congress in 1875 and served for twelve years, being the author of the Reagan Interstate Commerce Act, which was passed in 1887. All interstate commerce legislation has since been based on the Reagan bill, one of the most important measures introduced into Congress since the Civil War. In 1887 he was elected to the United States Senate but resigned in 1891 to become chairman of the Texas state railroad commission.

A repeating pattern of book spines for 'The New Practical Reference Library'. Each spine is a small, brown, rectangular book with a gold-colored border and the title 'THE NEW PRACTICAL REFERENCE LIBRARY' in gold capital letters. The spines are arranged in a grid, with each spine representing a different subject. The subjects are listed below each spine in a matching gold color. The subjects are: ALGEBRA, MONEY, BANKING, ETHICS, PSYCHOLOGY, PEDAGOGY, PHILOSOPHY, PHYSICAL CULTURE, GAMES AND PLAYS, DRAWING, ARCHITECTURE, SCULPTURE, MUSIC, PAINTING, MECHANICS, PRACTICAL AESTHETICS, MACHINES AND ENGINEERING, NATURE STUDY, PHYSIOLOGY, BOTANY, ZOOLOGY, PHYSICS, CHEMISTRY, GEOLOGY, METHODS, PLANS, OUTLINES, TEST QUESTIONS, TYPE STUDIES, CIVIL GOVERNMENT, POLITICAL ECONOMY, LAW, SOCIOLOGY, READING, LANGUAGE, GRAMMAR, LITERATURE, MYTHOLOGY, MANUAL TRAINING, DOMESTIC SCIENCE, GRAPHIC ILLUSTRATIONS, CHARTS, MAPS, COLORED PLATES, and GARDENING. The pattern is repeated multiple times across the entire image.



